

68 NEW PRODUCTS: PAGE 221 • 24 PRODUCT REVIEWS: PAGE 180

# MACWORLD

The Macintosh<sup>®</sup> Magazine

February 1990 \$3.95

Canada \$4.95

## EXTINCT?

UPGRADE STRATEGIES THAT KEEP  
YOUR COMPUTER ALIVE

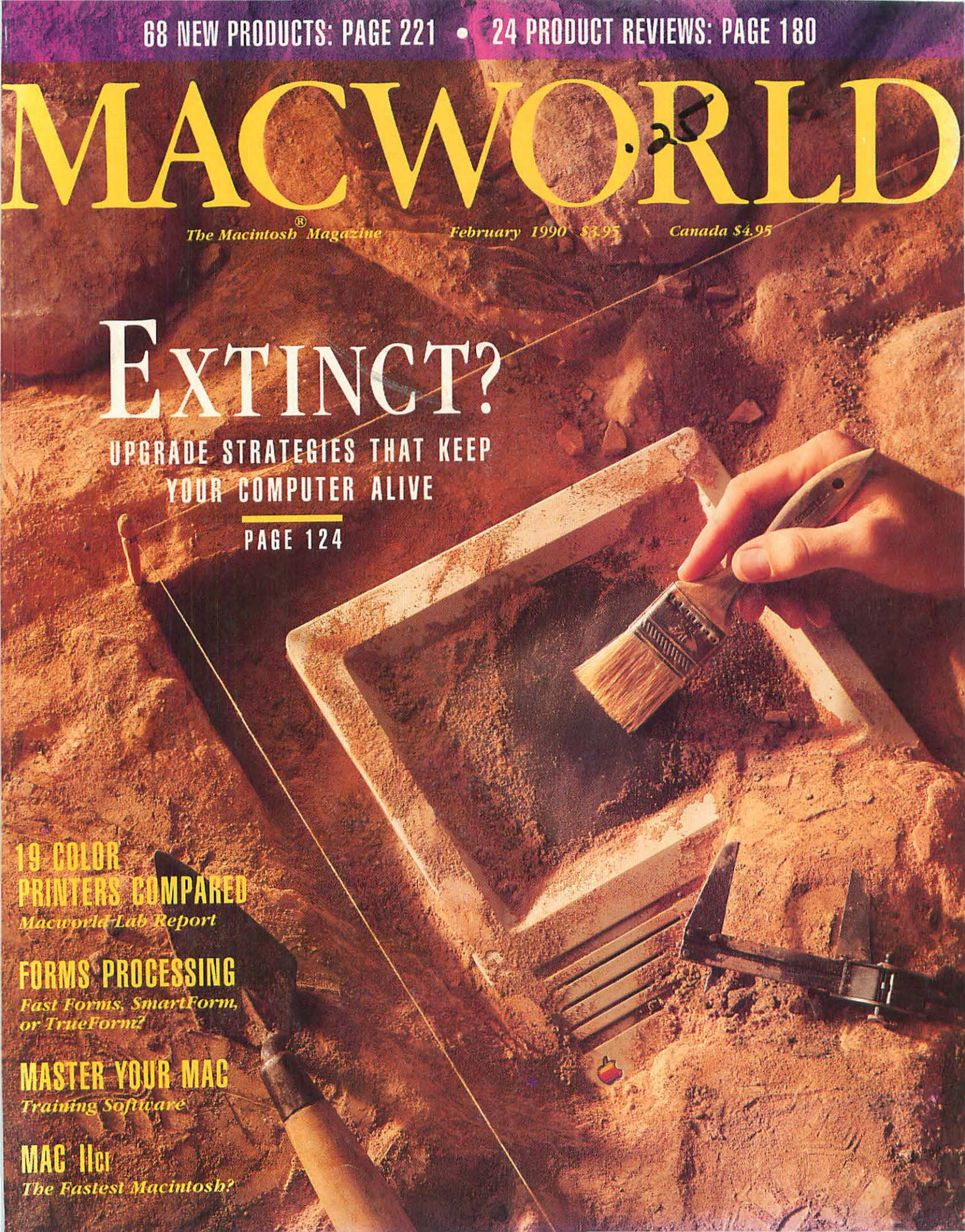
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19 COLOR  
PRINTERS COMPARED  
*Macworld Lab Report*

FORMS PROCESSING  
*Fast Forms, SmartForm,  
or TrueForm?*

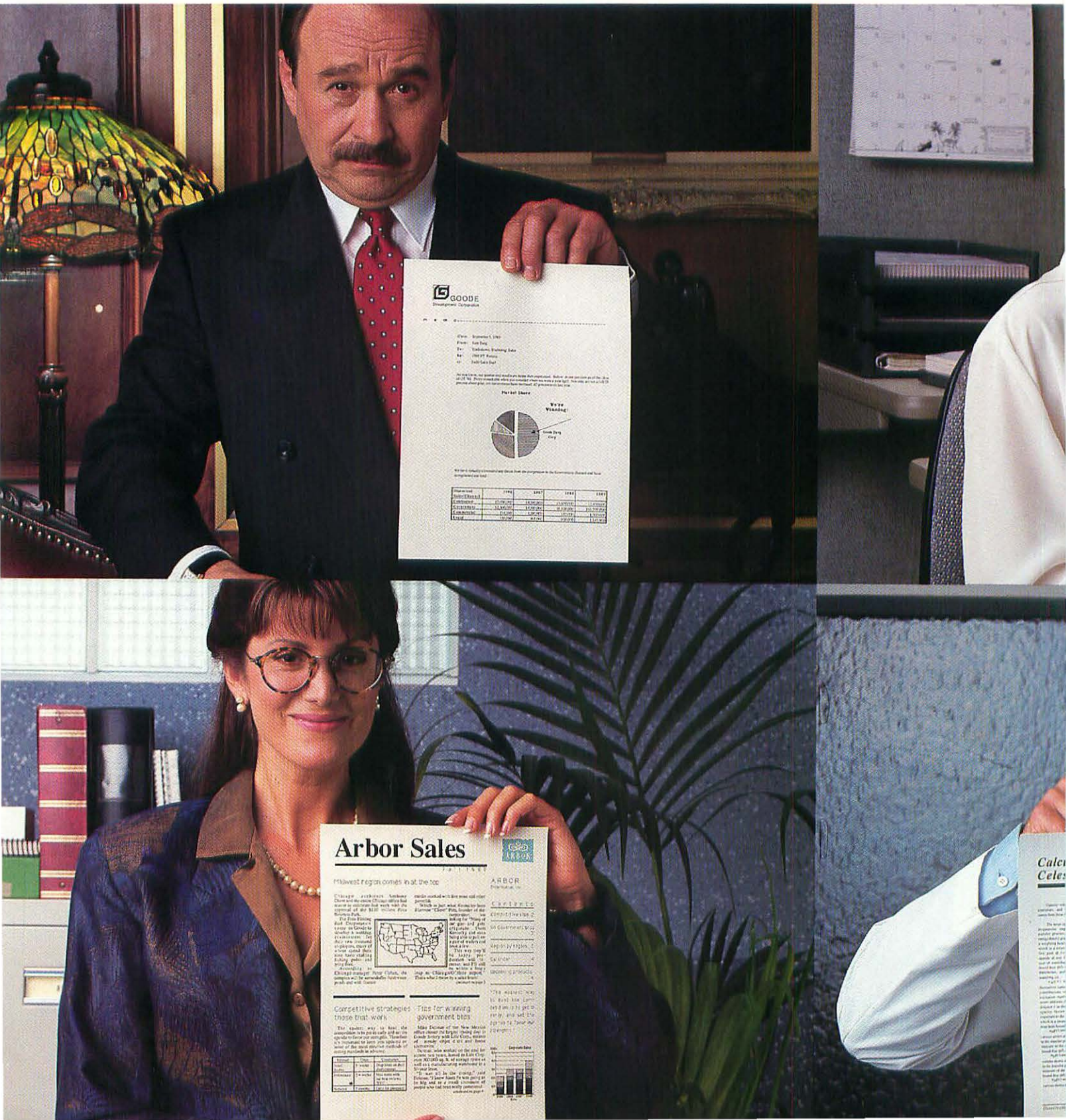
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MAC IIcx  
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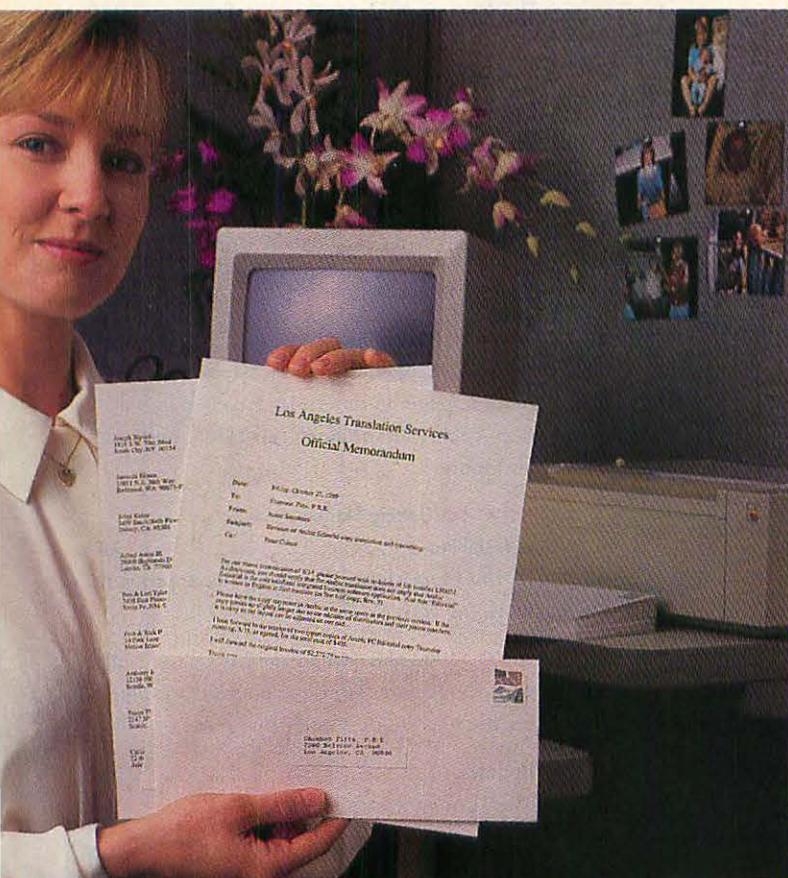
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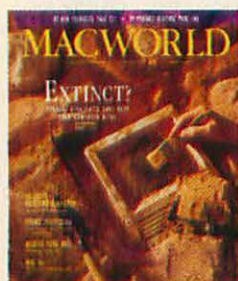
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# MACWORLD

The Macintosh® Magazine February 1990



Has your aging Mac gotten buried under an avalanche of newer and more powerful machines? Don't get angry; get even—with more memory, speed, and capabilities. For the best upgrade strategies, see page 124. (Photo by Paul Franz-Moore.)

The Mac brings American history to life in the classroom—thanks to National Geographic and Lucasfilm (see page 101).

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*Lino is no longer the only game in town—now there's an array of PostScript imagesetters to choose from (page 140).*

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*Win thousands of dollars' worth of hardware and software! Cast your ballot for your favorite Mac products, page 173.*





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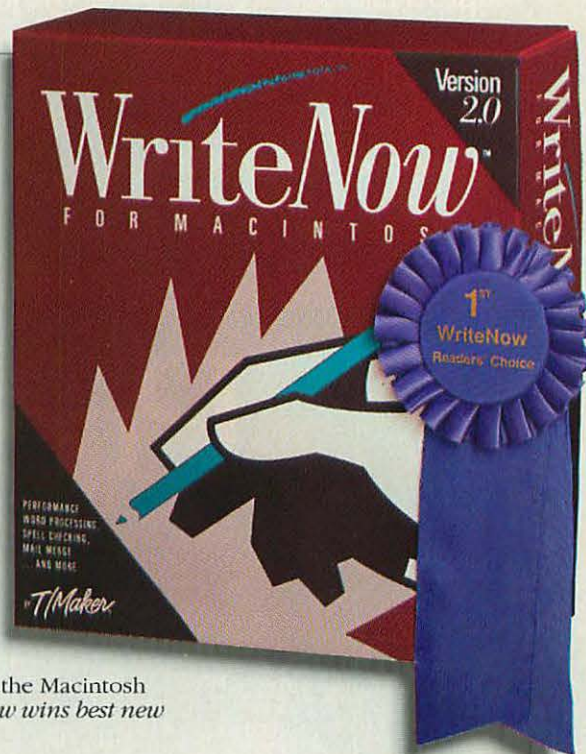
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MACazine, January 1989

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MacGuide, Winter 1988



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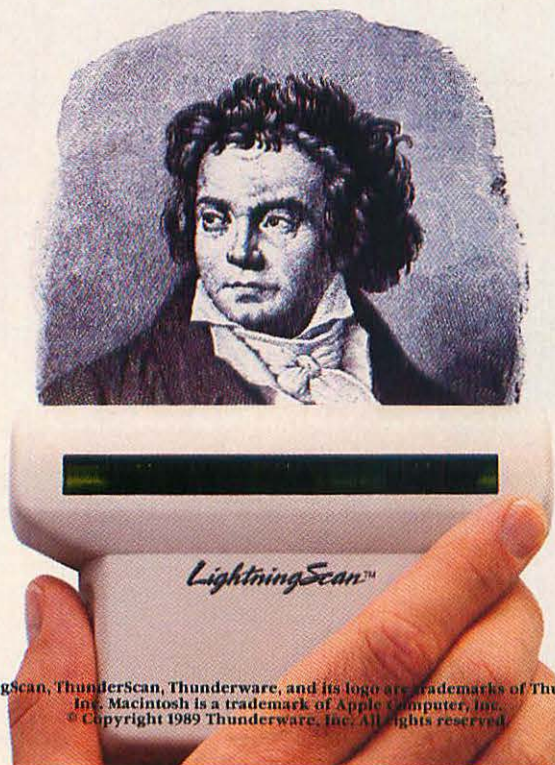
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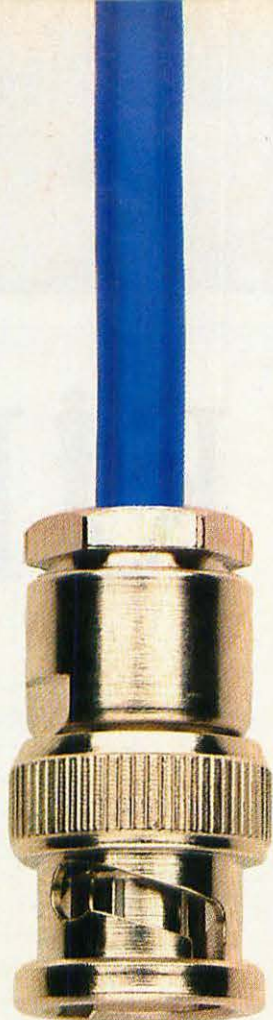
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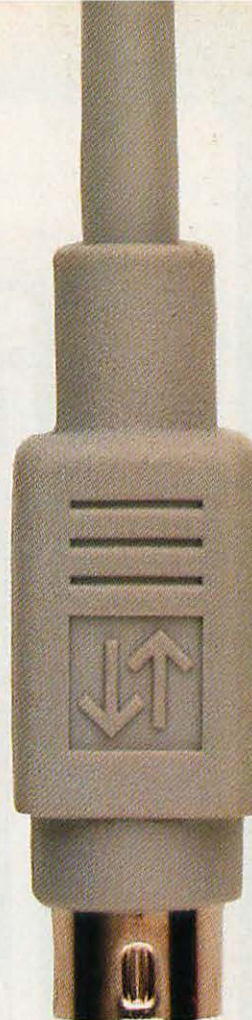
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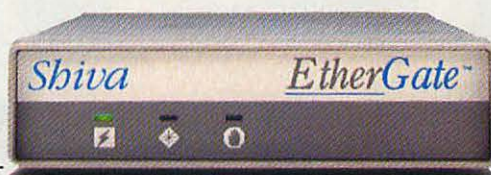




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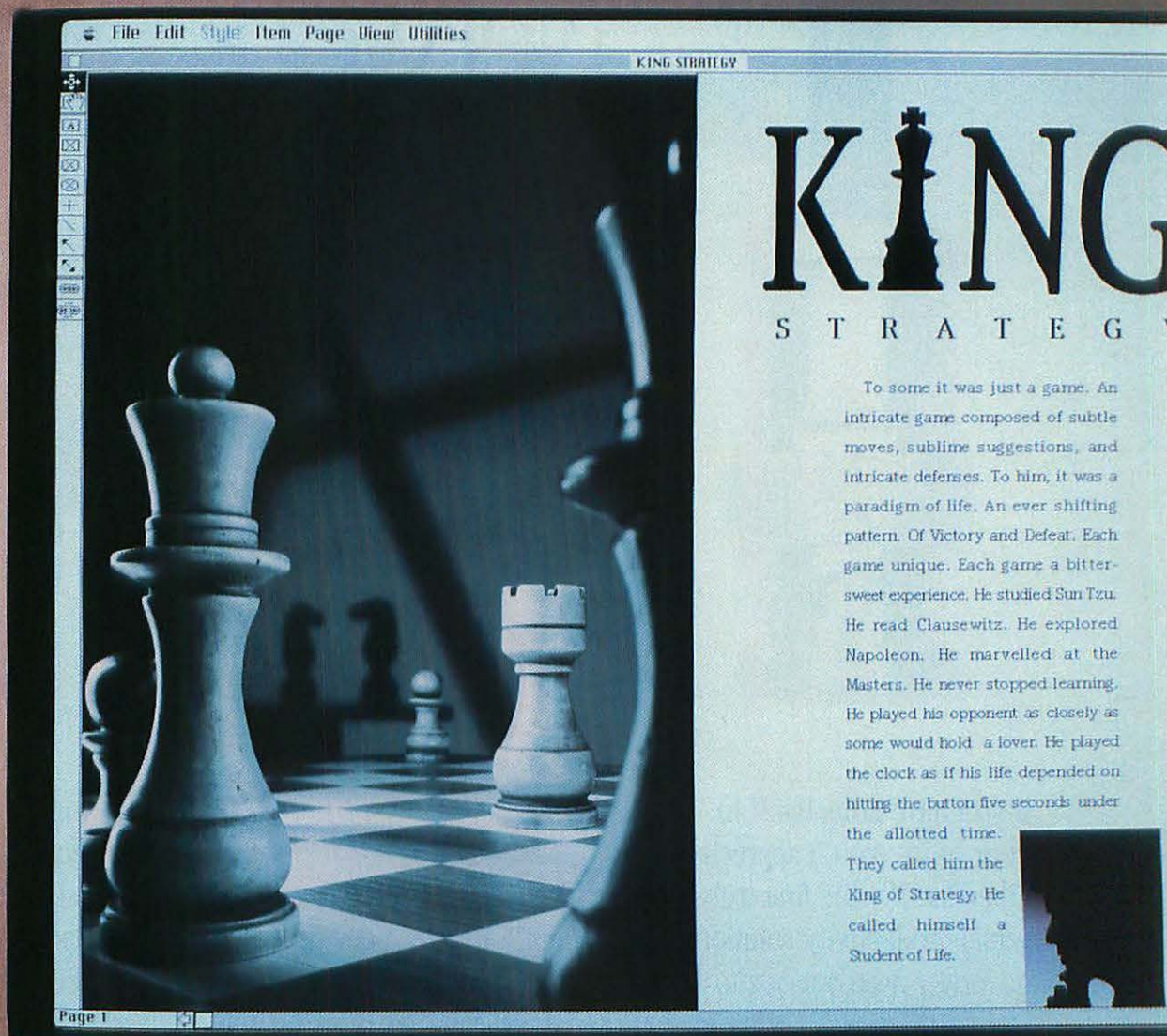
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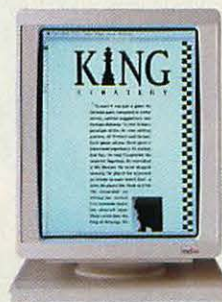
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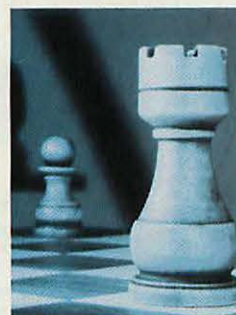
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SuperMac's revolutionary new 24-bit True Color graphics system puts the "quick" back in QuickDraw.

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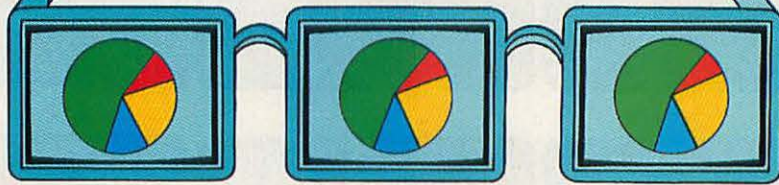


*Images shown are actual screen-images photographed directly from a SuperMac 19" display. Original photography was scanned with a Barneyscan 24-bit scanner into PixelPaint Professional running on a Macintosh Iix equipped with a Spectrum/24 Series III graphics card.*

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# What to do with Timbuktu.



## Share screens.

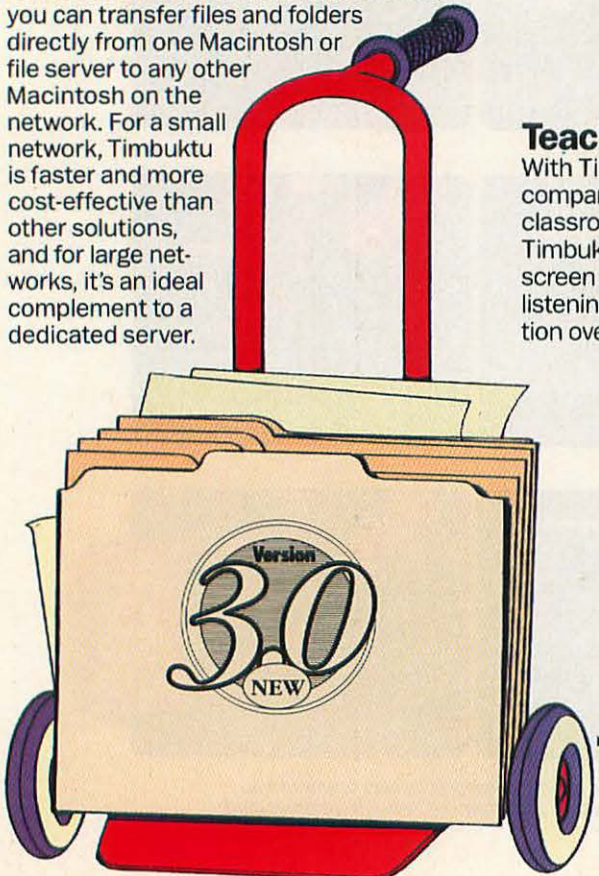
With Timbuktu on every Macintosh, you can invite others to share your point of view. (Advanced password protection ensures privacy.) Sharing screens allows two or more users to work on any document simultaneously. It also allows user support people to help solve users' problems without leaving their desks. Combine Timbuktu with Farallon's network management software, and support people can manage computers and servers from anywhere on the network. Timbuktu/Remote functions similarly to Timbuktu, only over modems or ISDN links.

## Share resources.

With Timbuktu installed on each Macintosh throughout the network, you can access any Macintosh and its databases, FAX modems, file or mail servers, or mainframe connections from any Macintosh on the network.

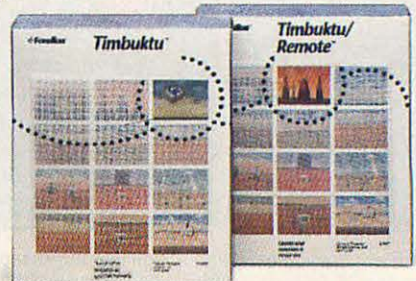
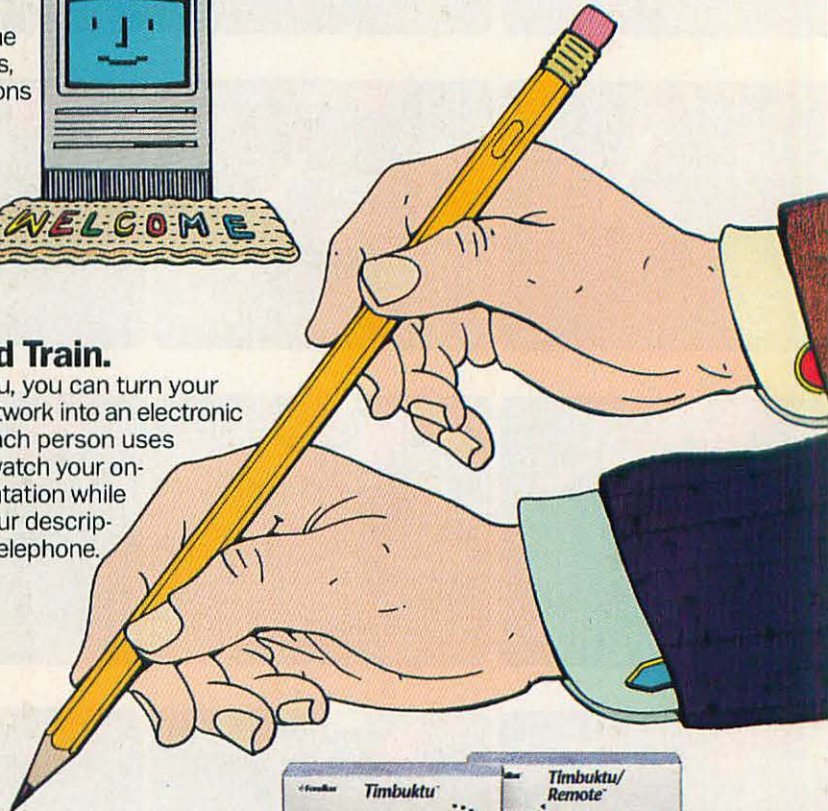


**Transfer files.** With Timbuktu 3.0, you can transfer files and folders directly from one Macintosh or file server to any other Macintosh on the network. For a small network, Timbuktu is faster and more cost-effective than other solutions, and for large networks, it's an ideal complement to a dedicated server.



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# MAC BULLETIN

## INDUSTRY NOTES

### Priam Files Chapter 11

*Hard disk manufacturer Priam has filed for Chapter 11 protection from creditors. Priam also reduced its work force by 35 percent.*

### Sony Acquires UNIX, Mac Network Tools

*Sony has purchased 20 percent of Information Presentation Technologies. IPT's products include uShare, which provides AppleTalk Filing Protocol (AppleShare) services to UNIX systems, and the recently announced Personal Server Network, a TOPS competitor.*

### RagTime Publisher Opens Doors in U.S.

*RagTime's European publisher has opened U.S. offices. The subsidiary, tentatively named Saturday Software, is at 400 Walnut St., #501, Redwood City, CA 94063. RagTime 3.0 should ship in early 1990. For more information, call 415/780-1800.*

### Quantum Sales and Earnings Up

*Quantum Corporation, which recently experienced problems with its popular 40MB and 80MB hard disks, reported that its sales for the quarter ending October 1 reached \$113.4 million, up 185 percent over the same quarter of 1988. Net income also increased from \$2.1 million for third quarter 1988 to \$12.5 million.*

### The Expert Oracle

*Millenium's HyperX Fusion, a HyperCard-based knowledge-system development tool, can now gather information from Oracle relational databases via Oracle's HyperCard front end for the Macintosh. Belmont, California-based Oracle and Laguna Beach, California-based Millenium Software are also planning a comarketing deal. For more information, contact Millenium at 714/497-7439 and Oracle at 415/598-8000.*

## Is Color Crushing Your Desktop?

Electronics For Imaging (EFI) is developing a set of **color-compression algorithms** for making those huge disk files of color scans a thing of the past. The new company claims its algorithms, which are designed so that application developers can incorporate them into software for any platform, **can reduce color files to anywhere from 1/10 to 1/50 of their original size.** It replaces raster (dot or pixel) information with color frequencies and then examines the frequencies to strip out unnecessary information. Decompressing a file reconverts it to raster format, so the reconstituted file is the same size as the original even though it contains less color information. For more information, contact EFI at 415/742-3400.

## Aldus Changes Color Plans

**Aldus has abandoned work on Aldus Separator**, the color-separation project it was developing with Prepress Technologies, and instead plans to publish a product it has been developing internally. PrePrint, which Aldus is labeling postprocessing software, will separate PageMaker documents and other documents that conform to Adobe PostScript color conventions, and allow users to adjust contrast and brightness. Aldus expects to ship PrePrint early in the second quarter at \$495 list. Reduced pricing will be available for owners of PageMaker Color Extension. For more information, contact Aldus at 206/622-5500.

## Quark Releases Color Separation Spec

Desktop Color Separation (DCS) is a set of color-separation algorithms implemented in QuarkXPress as of version 2.0. **Quark is making the specification public** and encouraging application developers to incorporate it in their software to enable programs not intended for color manipulation—for example, most word processors—to import color images and generate four-color separations when printed. Avalon's PhotoMac uses DCS, and Letraset's ColorStudio will also support it. For more information, contact Quark at 303/934-2211.

## Canvas Upgrade Adds Four-Color Steps

Deneba is loading its combination paint-draw package, Canvas, with new features to keep up with, and in some areas surpass, competing products such as MacDraw, SuperPaint, and Adobe Illustrator. Version 2.1 comes with a process color separation utility that **enables you to adjust color, line-screen frequency, and screen angles.** It can import MacDraw II in native format and save in EPS. The new version also adds dashed lines, a 100,000-word Coach-compatible spelling checker, an object-alignment dialog box, and the ability to add points to already-defined bezier curves. List price for Canvas 2.1 will remain \$295; upgrade pricing had not been decided at press time. For more information, contact Deneba at 305/594-6965.

## GatorMail Lets Mac E-mail and UNIX E-mail Talk

Cayman Systems has announced software **to let QuickMail and Microsoft Mail communicate with Simple Mail Transfer Protocol (SMTP)-based E-mail**, the standard UNIX E-mail protocol. GatorMail-Q, for QuickMail, and GatorMail-M, for Microsoft Mail, require a LocalTalk-to-Ethernet (TCP/IP) gateway such as Cayman's GatorBox or a similar unit. Besides translating AppleTalk protocols to TCP/IP protocols, the Cayman box also runs special-purpose applications, including GatorShare, which translates AppleShare's filing system into the UNIX standard Network File System. At press time pricing had not been set for these products. For more information, contact Cayman Systems at 617/494-1999.

*(continues)*



## INDUSTRY NOTES Motif for Macs

*Integrated Computer Solutions of Cambridge, Massachusetts, is shipping an A/UX version of the Open Software Foundation's Motif, a standard graphical user interface for UNIX. For more information, contact Integrated Computer Solutions at 617/597-0510.*

## Blyth Software Back in Black

*Blyth Holdings, parent company of Omnis 5's publisher, reported net profits of \$155,683 on sales of \$970,294 for the quarter ending September 30. For the same quarter last year Blyth lost \$557,013 on sales of \$696,820.*

## Network Copy Protection Looms?

*A new version of copy protection has arrived. Using Network Awareness or AppleTalk Piracy Protection, most network applications such as E-Mail, as well as many single-user applications, search AppleTalk for duplicate serial numbers and refuse to run if duplicates exist. While this does not cripple legitimate use of software, it loads overburdened AppleTalk with extra packets and straddles network administrators with keeping serial numbers straight.*

## Software Sales Reported

*The Software Publishers Association reports that MS-DOS software sales increased by 11.2 percent to \$593 million for the third quarter of 1989, while Macintosh software sales increased 19.4 percent to \$112 million for the same period. Curiously, desktop publishing and graphics software for the Macintosh showed sharp declines, while word processors, databases, and spreadsheets showed steep growth.*

## Ehman Sales Up

*Ehman, seller of disk drives and other Mac peripherals, reported record sales of \$5.1 million for the first quarter of fiscal 1990. The Evanston, Wyoming, company also said that its profits for the same quarter hit a record \$519,000. Compared with the same quarter last year, sales were up 609 percent, while profits rose by 80 percent. Ehman cited a strong Mac peripherals market and gains in market share.*

## MacInTax Files Electronically in 1989

SoftView's automated tax software is adding a new feature for fiscal year 1989. After stepping through all the schedules your taxes require, you can either print out a return that looks exactly like the IRS's and mail it in, or, **for \$29.95, send your data to the IRS via modem.** Users who file electronically can expect **refunds within two weeks.** MacInTax lists for \$99 and costs \$55 for owners of last year's version. For more information, contact SoftView at 805/385-5000.

## The Distributed Server

A new networking product claims to combine the best of TOPS and AppleShare. Personal Server Network uses AppleShare client software to let **networked Macs act as fully AFP-compatible file servers or, like TOPS, as clients without a centralized server.** PSN provides client and server services among any combination of Macs, MS-DOS, and UNIX machines; works with AppleTalk or EtherTalk; and is compatible with all AppleTalk bridges. PSN lists for \$529 for four users, \$999 for ten users. For more information, contact Information Presentation Technologies at 818/347-7791.

## AuraCAD's Plot Thickens

AuraCAD/CAM, Aura Systems' subsidiary that was formerly MicroCAD/CAM Systems, is working on a **3-D mechanical-design package to be called AuraModeler.** AuraModeler's tools resemble the 2-D tools in MGMStation (now Aura/CAD), adapted for 3-D work. Features include multiple user-definable views; a floating-point database that can perform dimensioning and move with a file to other Aura packages to generate 2-D drawings or CNC code; and a system of movable, reshappable PowerPalettes, which hold up to 32 tools, menu items, or macros of the user's choice. AuraModeler will list for \$599. For more information, contact AuraCAD/CAM at 818/376-0008.

## Intel Announces Modem Option for the Mac

Intel's Personal Computer Enhancement Operation (PCEO) announced a 2400-bps external modem for the Mac bundled with communications software at Comdex. The 2400EX MNP **supports MNP classes 1 through 5 for better data transmission and compression.** The modem is available for \$499 with Intel's Macintosh option, including a Mac cable and Microphone communications software from Software Ventures. Intel's existing 2400EX external 2400-bps modem is also now available with the Macintosh option for \$399. For more information call Intel's PCEO at 800/538-3373.

## Adobe Type Manager Add-on Creates Special Effects

Emerald City Software's new TypeAlign **takes advantage of Adobe Type Manager to generate PostScript effects** with type. Type can be attached to straight lines, arcs, or freehand forms and then stretched, rotated, distorted, and colored with the Mac's full 16.7 million color palette. You can also add perspective to a block of type. Letters can be kerned to 1/1000 of an em space, but kerning cannot be saved in tables or applied to other letter pairs. Detailed paths can be saved as templates and reused. TypeAlign lists for \$99.95. It requires Adobe Type Manager and works only with Type 1 fonts. For more information, contact Emerald City at 415/324-8080.

## ATM to Get Some Company

Phoenix, Arizona-based The Font Company is **readying 1500 typefaces in PostScript Type 1 versions** that it says will be compatible with Adobe Type Manager. ATM is a utility that generates screen display and output on non-PostScript printers from the PostScript information stored in downloadable printer fonts. The Font Company distributes the German type house URW's type library in the United States. For more information contact The Font Company at 602/996-6606.

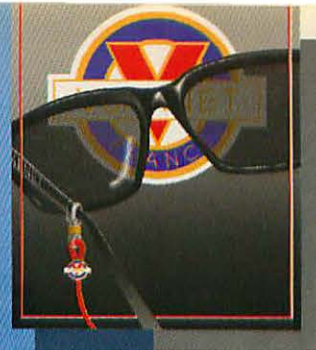
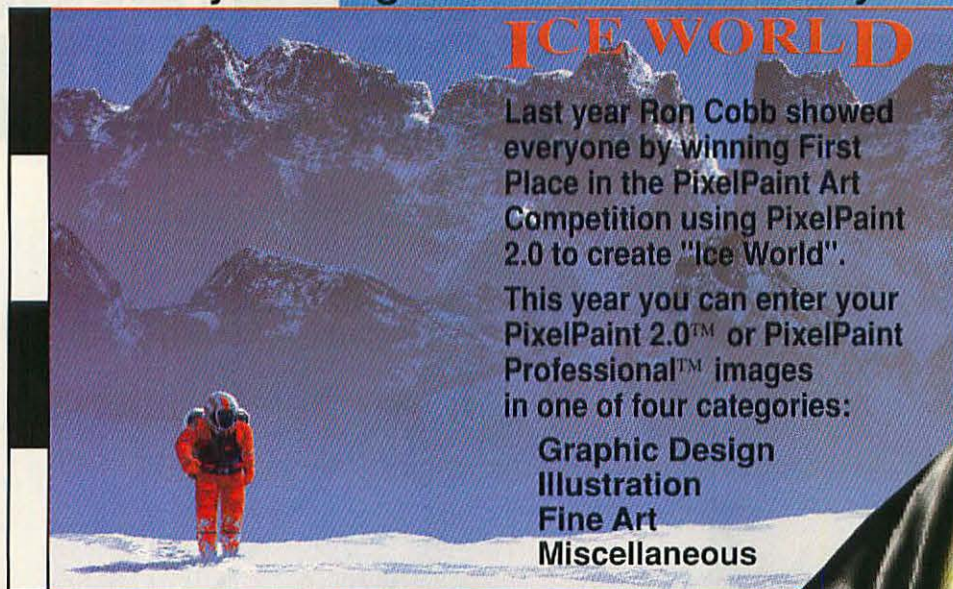
## A Box Packed with Printer Drivers

GDT Softworks is shipping its PrintLink Collection, which **allows a Macintosh to drive a wide variety of non-Apple dot matrix and ink-jet printers** including printers from Epson, Panasonic, Okidata, Brother, NEC, and Diconix. GDT claims the drivers are ATM-compatible. PrintLink Collection lists for \$99 with a serial cable, and a \$189 version is available for parallel printers that comes with a serial-to-parallel converter. For more information, contact GDT Softworks at 604/291-9121. **M**



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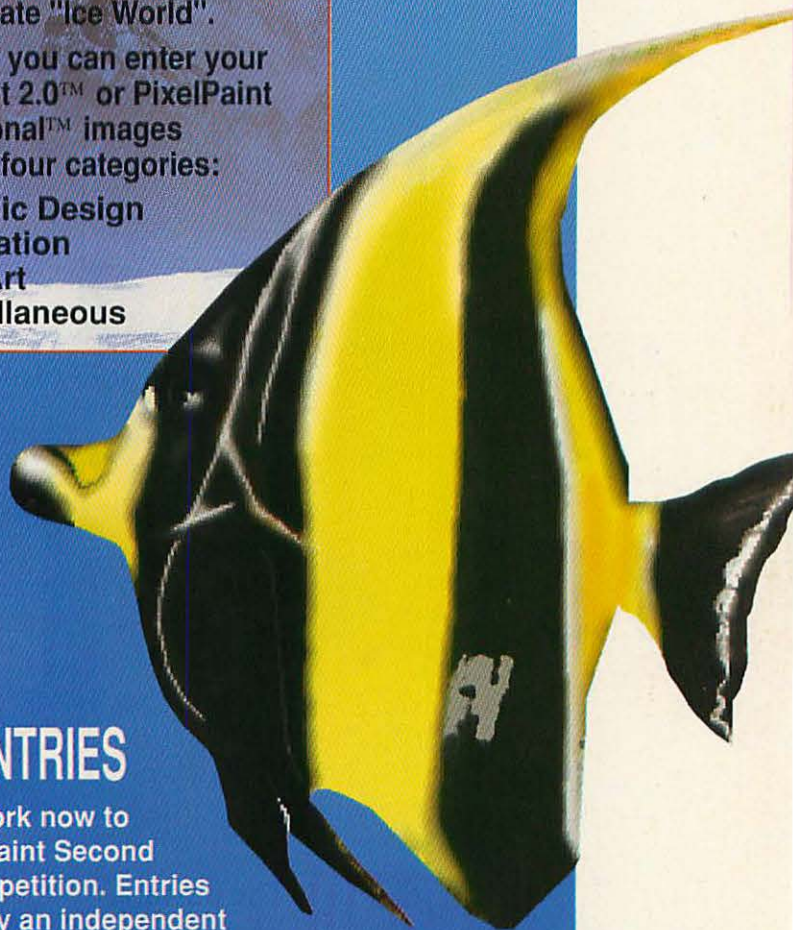
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Winners will receive valuable prizes including AppleCD SC drives, SuperMac video cards and 19-inch Trinitron monitors and other Macintosh hardware & software.

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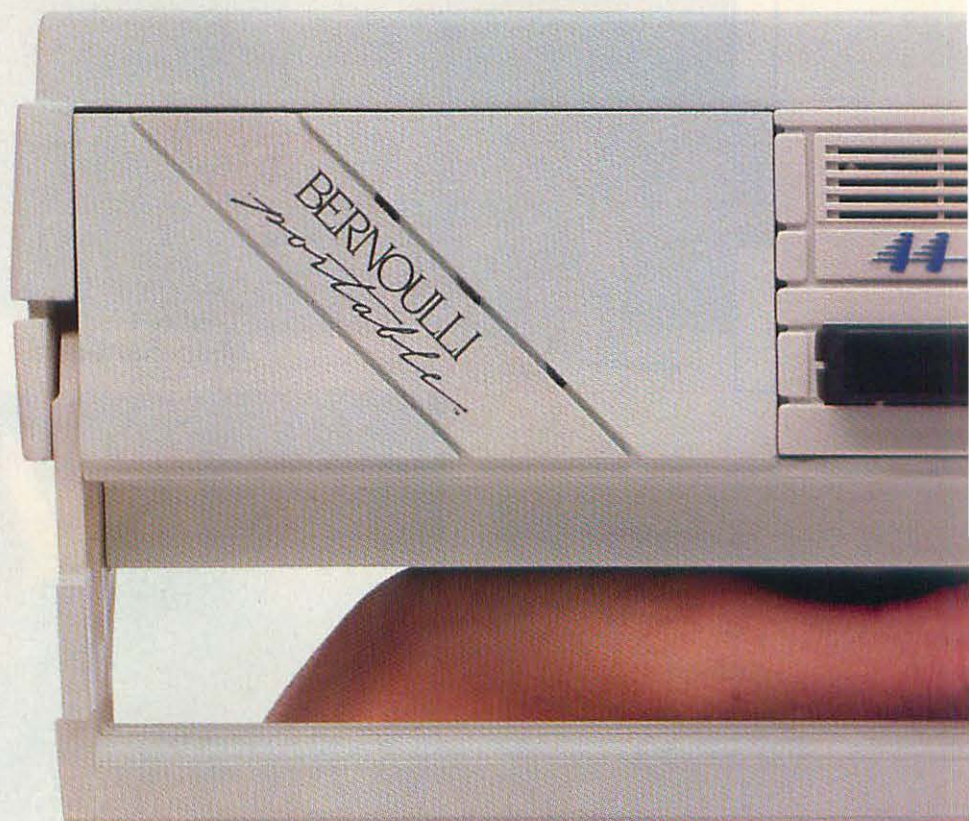
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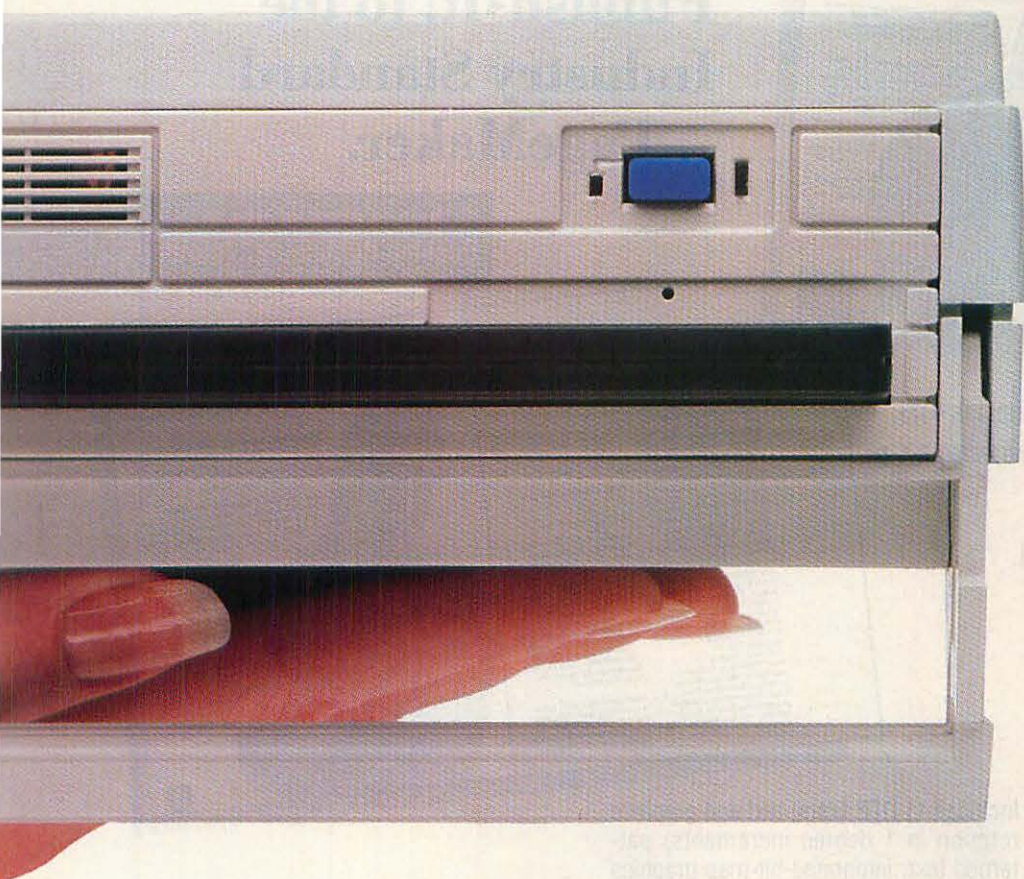
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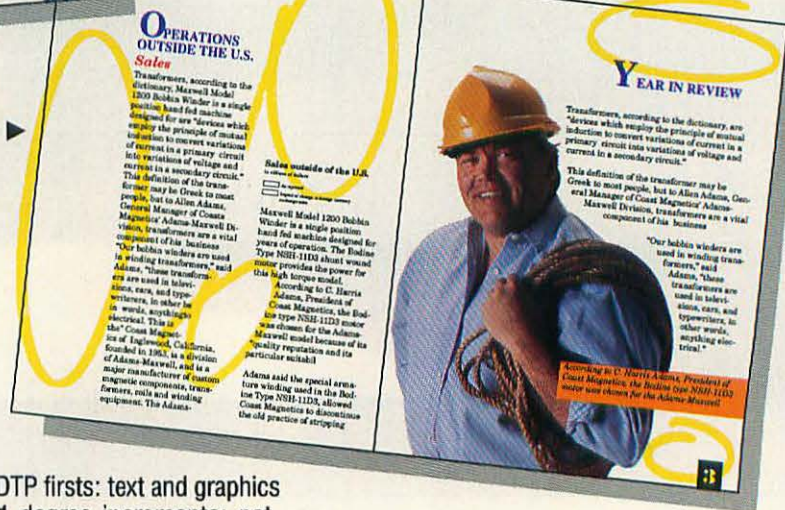


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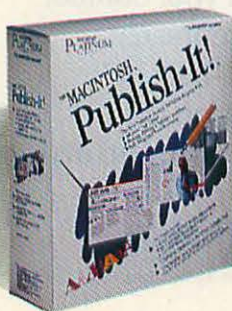


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# ISDN...What?

The United States lags  
in communications  
but there's neat stuff ahead

by Jerry Borrell

One evening last autumn, the time of year when the few leaves that fall from trees in California do so, I headed toward Farallon's offices in Berkeley. It was one of those midweek meetings that happen so often in the computer industry, after most other people have long since departed in the dark for home. I make the short drive over the Bay Bridge a few times a year to sit in the solitude of the closed Farallon offices so that I can talk with Farallon president

Reese Jones and vice president of engineering Rob Harrington about their vision of the future. And each time, I leave with more insight into where the world of Macintosh computing is heading. The realm of the Mac in terms of CPUs is fairly predictable: a 33MHz machine, a low-cost machine, RISC processors, new printers, a phased rollout for System 7.0 software, a next-generation operating system that is not based on QuickDraw. But there is an area long overdue for more announcements: communications, an area of technology that Jean-Louis Gassée spoke about a great deal more when he first came to Apple in the United States.

A lot of things are being talked about—personal AppleShare, AppleMail, higher

transmission rates over LocalTalk, Ethernet implemented over LocalTalk (that is, EtherTalk). Gassée has again begun talking about communications. Gassée talks around details, as is his wont, preferring to allow his audience to read between the lines. But the key point of some crucial aspect of Apple's

future often lies buried within the context of his seeming generalizations. These days, he talks about ISDN, the International Standards Organization's acronym for Integrated Systems Digital Network.

In general, Apple's technology has allowed me to become parochial in my attention to the world of computers and communications, especially the latter. I

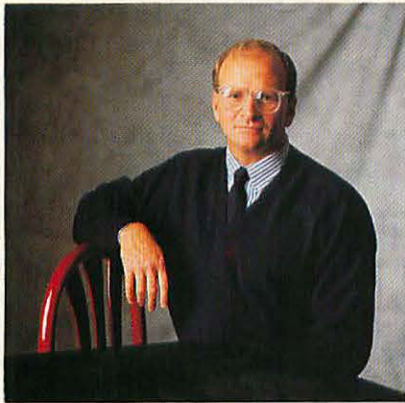
don't focus on T1 or T3 networks. I don't worry about the implementation of standards or protocols. Apple takes care of the details, and I get to focus on the implementation of technology from a user's point of view. But ISDN is one of those technological oddities, like high-definition television, that by their importance threaten to elevate themselves into the public consciousness.

ISDN is a standard that defines the implementation of communications, voice, data, and video over a single cable. It has been discussed for over a decade in Europe, where the centralized Post Telephone and Telegraph (PTT) networks have the clout to do centralized planning for the future of telephony, computers, and communications in the home.

Ordinarily, it is at this point in the discussion that my head begins to nod. I tune out because the topic seems so esoteric, so nonessential to my day-to-day work that I find it unnecessary to give it additional attention. But during my meeting at Farallon last fall, when the talk turned to ISDN, the coincidence of both Jones and Gassée talking about these issues raised something in my consciousness—memories from a decade ago when I worked for Congress in Washington, D.C., and had the chance to meet with PTT officials in France and the United Kingdom to discuss their directions in technology—a time when the French were holding trials in several cities of what was then called videotex.

One such trial in a suburb of Paris replaced standard telephone handsets with Minitels, small 8-bit computers combined with telephone handsets offering the use of electronic online services. The most important were directory and yellow pages services. By 1980 there were some 20,000 units being tested throughout France. I expected these experiments to go the way of the dozens of trials with videotex in the United States over the last decade—nowhere. But by last September, as I sat eating dinner in Paris with Anthony Cagle of Apple Europe's research center and Apple's new director of European marketing Guerrino De Luca, I learned that the number of Minitels had risen to 20 million.

The French, long known for possess-  
(continues)





ing one of the poorest telephone systems of any industrialized country, have raced past the United States over the last decade and have modernized their entire telephone switching network with digital switching equipment.

#### SO WHO CARES?

As we dined, the next bomb hit. Says Cagle, "Next week they're installing an ISDN line in my apartment." That was one

too many coincidences. Before my eyes I saw headlines, TV news stories, a Michael Keaton movie, and a McNeill-Lehrer special report on how America had lost first the industrial race, then aspects of the computer race (memory chips), and now aspects of the communications race to Japan and Europe.

Here was Cagle making progress toward advanced networks that we're only now testing, by just calling up his tele-

phone company and placing an order. Meanwhile, in the United States we don't even have widespread use of telephone switching systems that combine voice and data.

In this era of deregulation there is little likelihood that ISDN, or even basic telephone switching systems, will be standardized, let alone become available by a phone call to your local service supplier. Rather, the future is likely to be defined by the largest gorilla in the jungle. And while AT&T is still the biggest telecommunications company, anyone who has attended working groups of standards committees in areas such as telecommunications knows that acceptance of even a well-defined standard is a slow and painful process.

#### WHAT DID YOU LEARN IN BERKELEY?

I learned that Reese Jones is starting to sound a lot like Jean-Louis Gassée—on several levels. For one thing, Farallon has become so successful that Reese doesn't like to talk numbers, does not really want anyone to know that Farallon is probably up to \$50 million in annual revenues and has only one competitor for PhoneNet, its main product. Or that its nearest competitor has less than a 5 percent market share. Or that its twisted-pair implementation of LocalTalk is preferred over Apple's own single-wire approach. Or that PhoneNet has enormous growth potential because Apple's EtherTalk implementation gives PhoneNet users an easy upgrade path to higher network transmission speeds.

But Reese does like to talk about technology. This young man, cofounder of the Berkeley Macintosh User Group and Ph.D. student at UC Berkeley, was too excited by what he was doing to finish his academic pursuit of what others had done. His venture absorbed another company with an interest in advanced communications technologies: WOS Data Systems, producer of Timbuktu and Timbuktu Remote.

Somewhere along the line, as his company expanded from 3 people to over 125, Reese's knowledge and interest in telephony and its possibilities have become all-consuming. Probably nowhere in the Macintosh community is there a single person with such an all-encompass-

(continues)

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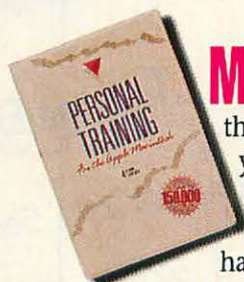




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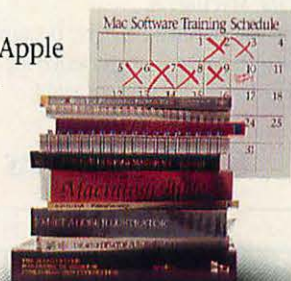
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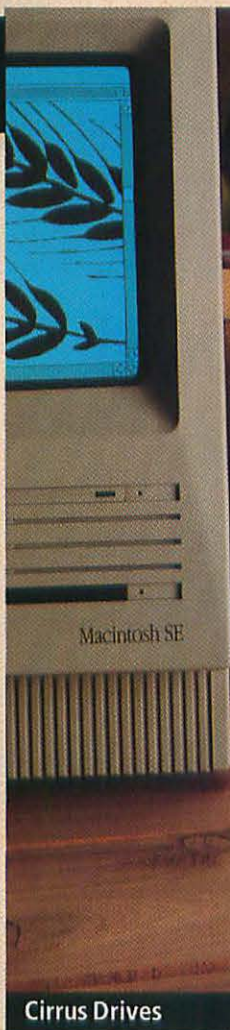
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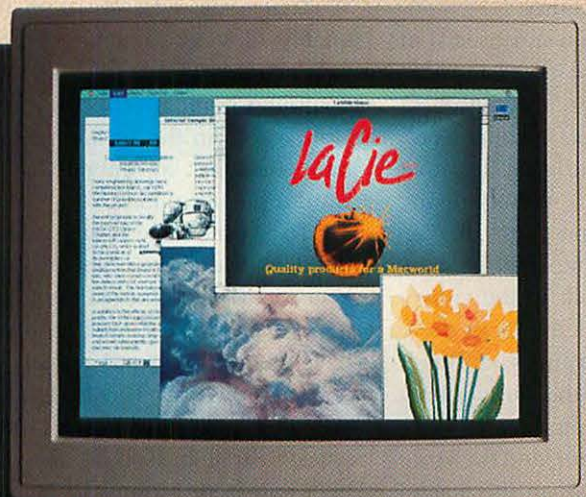
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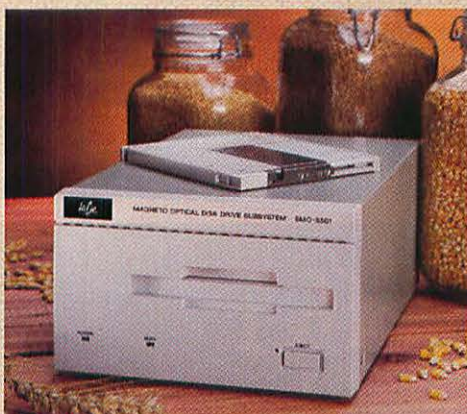
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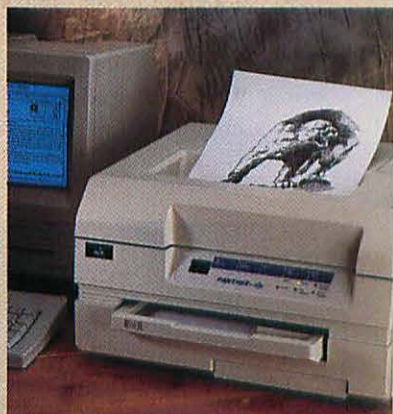
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ing vision of what distributed computing and networks are capable of when combined with the Mac. The problem is to interpret the web of Reese's thoughts and put them in the context of what's going on with networking and communications.

Farallon has had a great interest in voice and sound, leading to an initial product called MacRecorder. It's a little box and accompanying software that, when connected to a Mac, allows for real-time digitization, compression, storage, and manipulation of limited amounts of sound (how much depends on the fidelity of the sound you want captured). But as Reese points out, the Mac is too expensive to be used as a telephone recording device. However, at about the same time it released MacRecorder Farallon produced ScreenRecorder, a product with a HyperCard front end that allows users to record screen actions and make little "movies" for demonstration, training, or support purposes. With further advances by the company's engineers in sound compression,

these two products are being combined in a product code-named Hollywood, which allows someone to record both sound and screen actions simultaneously.

I should not have been surprised (but still was) to find that Reese is working with Bright Star Technology's InterFACE (a revamped HyperAnimator) in conjunction with Hollywood to create a product that allows little "talking heads" to accompany the films. Desktop help programs, for example, can now be accompanied by little anthropomorphs who talk to the viewer while the Mac runs a demo. And there have been dramatic advances in Bright Star's product as well—the little talking head is now in 8 bits of color, the range of facial expressions is greater, and the voice synthesis is much better than the Macintalk-like quality of earlier versions. In fact, when combined with Hollywood and sufficient storage space, InterFACE can use any photograph for the talking head and use the person's actual voice. For example, you could choose to have Jean-

Louis Gassée introduce a product while the Mac replayed a demo (but no hand gestures yet).

That's still a far cry from the actual quality of video, but we've got several years before ISDN makes any impact on computer-communications networking. Hollywood, in the meantime, represents more than just an intermediate step toward a picture phone.

To give me some insight, Reese showed me Hollywood combined with E-mail. You could build a file of little talking heads of people on your E-mail address list, then have them pop up and actually read your mail aloud. Neat. The faces are realistic enough; voice fidelity is a factor of disk space. Farallon has produced a much better phonetic pronunciation mechanism for the talking head. The problem of compression or decompression on the fly is really the checkpoint—the better the quality of the voice, the more time needed for decompression.

(continues)

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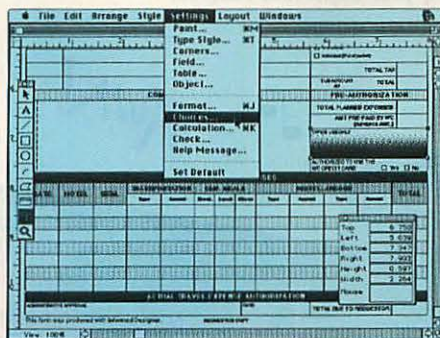
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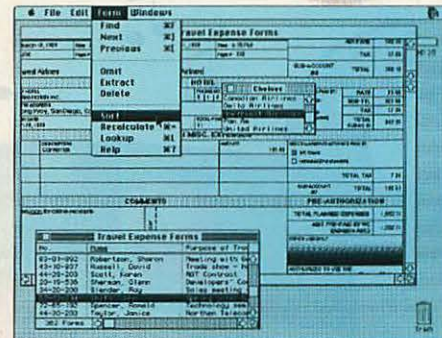
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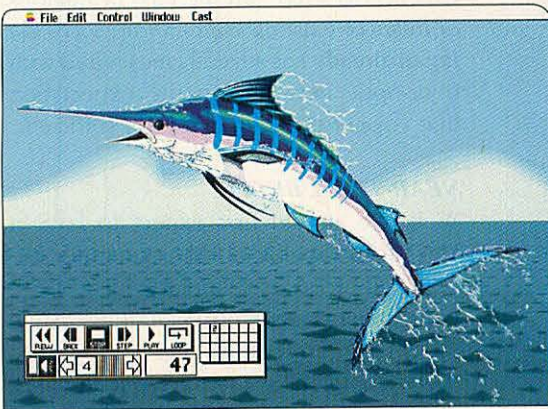


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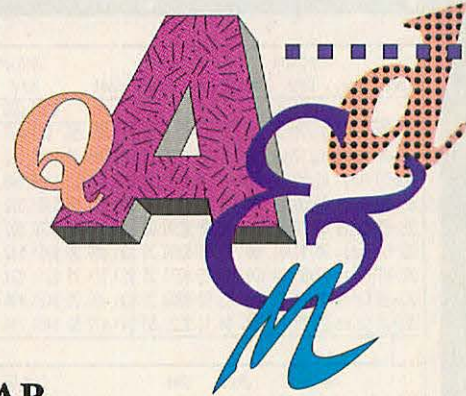
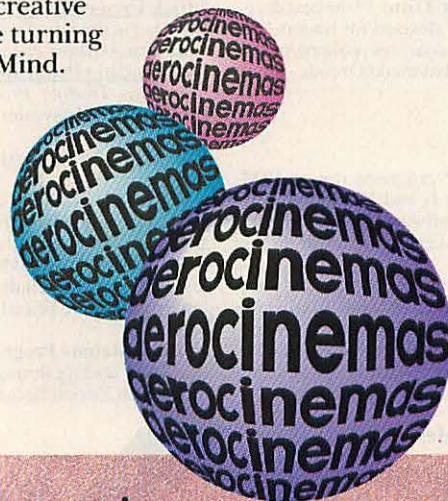
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OEX-HT Calls	07/06/89	700	\$5.75	\$1,259.25	\$4,037,599.25	\$2,556.25	08/14/89	\$25.00	\$1,259.25	\$1,748,740.75	\$1,344,981.50	\$1,751,297.00
OEX-IE Calls	08/24/89	1500	\$3.63	\$2,659.25	\$5,488,409.25	\$1,204,887.75	08/25/89	\$8.13	\$3,755.00	\$1,214,995.00	\$668,585.75	\$2,419,882.75
OEX-JE Calls	09/28/89	1500	\$4.13	\$2,659.25	\$6,211,409.25	\$1,738,473.50	10/05/89	\$10.00	\$4,598.75	\$1,495,401.25	\$873,992.00	\$3,293,874.75
\$3,193,874.75												

**77.78% Accurate:** Above are two charts of OEX trades from 1/1/89 to 10/5/89. The first chart contains actual trades based on the signals generated by one of our computerized trading programs, the **Right Time-Index Program™**. As you can see, the original cash on hand was \$100,000—the profits are over \$460,000. This method of purchasing the same number of contracts each time is a very conservative approach to trading.

The second chart contains theoretical trades using a pyramiding method of trading. With this method, and starting with the same \$100,000, the profits are over \$3,100,000. Notice that even when pyramiding, on some trades only 1500 contracts were purchased because in real trading it would be impossible to purchase more than 1500 contracts at a time.

**The Right Time™** computerized trading system was developed by an expert portfolio manager for his own personal use. Over the last nine years of in-market use the software has been perfected and made easy to use. Now it's available for any smart trader who wants to make quick profits from quick decisions.

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## SO WHAT ABOUT ISDN?

Is all this just marking time until real video and data services are available? No. These are the kinds of things that we'll be able to do with ISDN much more easily than we do now. There will be less severe need for data compression and decompression, for example. These are services we'll want to have, once distributed networks are more powerful. Until then people are finding ways to make them work on the limited networks we have today.

And Apple is thinking of these things, too. Last August in Boston, John Sculley demonstrated a skunkworks project—later alluded to in *Newsweek*—in Apple's Advanced Technology Group, headed up by Galyn Susman and Steve Perlman. Sculley showed decompression and transmission, over twisted-pair wires, of real-time video.

Lord help us. Is it possible that ISDN could come through existing phone cables? That, my friends, is the real question. Will we have to rewire America in order to offer a complete array of voice, video, and data services? Or can the tens of millions of miles of existing copper wire serve us? Japan already has several cities wired with fiber-optic networks in the expectation that copper twisted-pair is not sufficient.

## NEAR-TERM BETS

Well, we should first expect to have a Macintosh capable of both computer display and broadcast-standard video. We're going to have to have an operating system that's faster at graphics than QuickDraw. We're going to have to have silicon-based compression and decompression (which I hear Alain Rossman's new company is building as I write). And we're going to have to have companies that can build applications that take advantage of the new machines and networks.

In the near term we're going to see some exciting implementations of voice, video, and data that will remain useful even after ISDN arrives. There is a saying in computer science (and elsewhere) that there's no such thing as coincidence—there are reasons why people are looking forward to this standard. And what we're going to see soon will begin to be different from computer uses that we're accustomed to. **M**

Future results may vary

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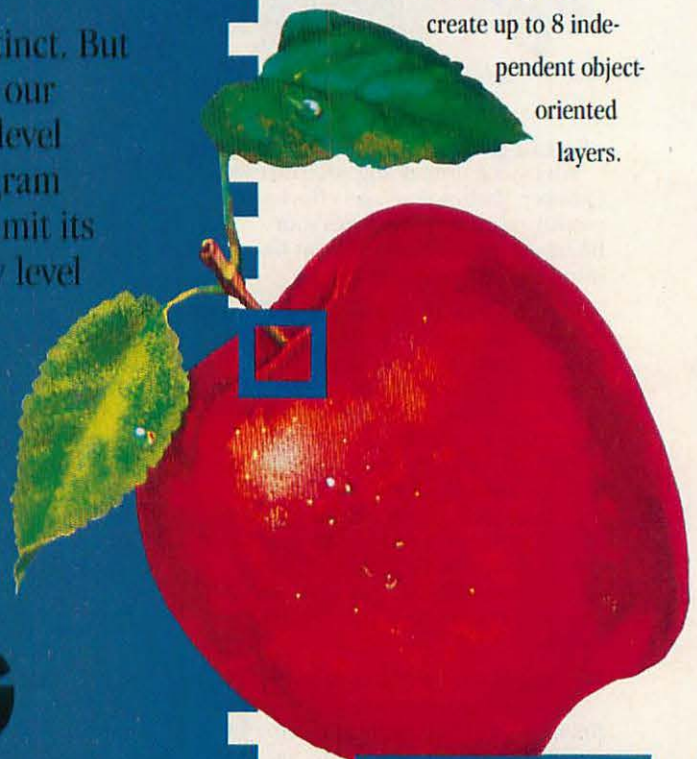
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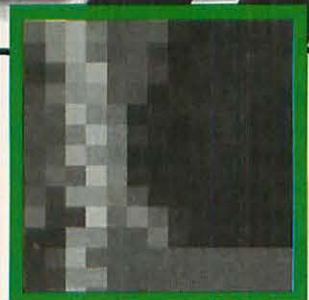
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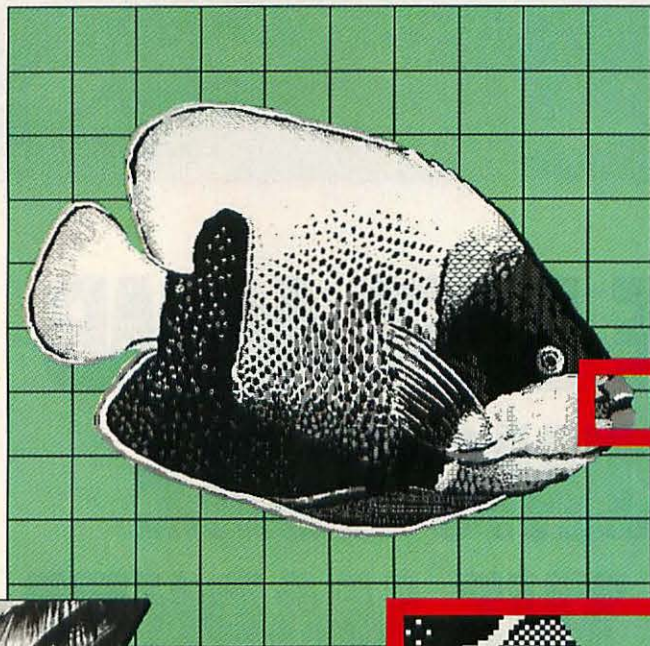
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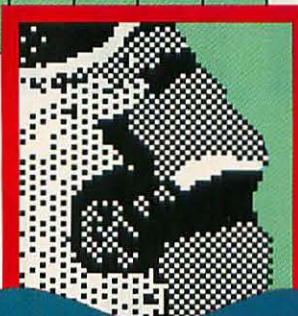
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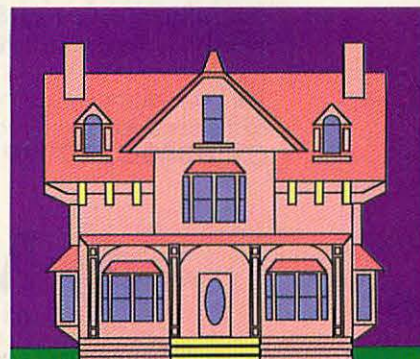
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# LETTERS

A forum for Macworld readers

## Computer Ailments

As a consultant in occupational ergonomics, I thought fellow readers might enjoy information on two books that provide insights on how to avoid such injuries.

*The Ergonomics Payoff: Designing the Electronic Office* (Nichols Publishing Co., 1986) offers some excellent information on workstation design. *Cumulative Trauma Disorders: A Manual for Musculoskeletal Diseases of the Upper Limbs* (Taylor and Francis, 1988) is a great source of information on hand, wrist, and arm problems that features numerous illustrations and good resource references.

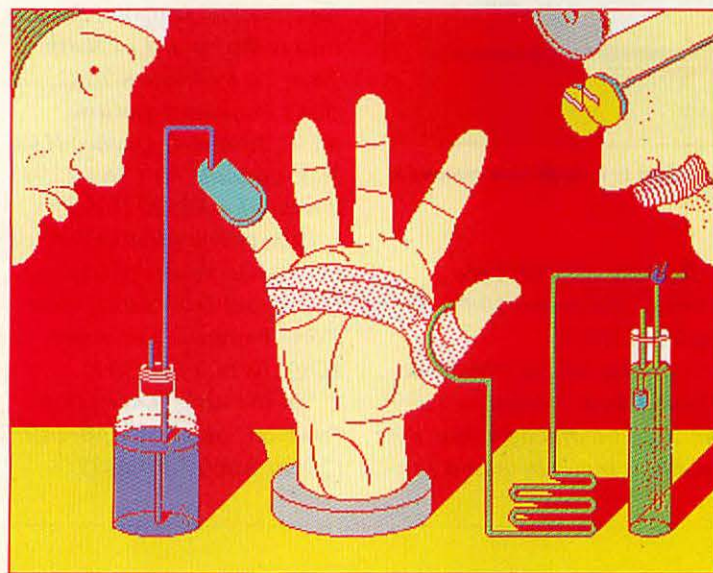
Through education on proper workplace design, repetitive trauma injuries are preventable in most cases.

Ronald B. Castle  
Castle Industrial Marketing  
McMinnville, Tennessee

For more on ergonomics, see "Warning: Computing Can Be Hazardous to Your Health" in the January 1990 issue.—Ed.

## The One That Got Away

We were glad to see our animated desktop program, Fish, included in "Mr. X's Xmas List" [December 1989]. But because you were unable to include addresses in *Where to Buy* that month—and we have no phone number yet—readers had no



way to contact us. Our address is 15600 N.E. Eighth St., #A3334, Bellevue, WA 98008.

Incidentally, Fish 2.0 now includes a screen saver that turns your unattended Mac screen into an aquarium.

Tom Saxton  
Tom and Ed's Bogus Software  
Bellevue, Washington

## HyperComposer Sounds Off

We found several inaccuracies in your review of HyperComposer, the Sound and Music Toolkit for HyperCard [Reviews, December 1989].

HyperComposer is compatible with all Systems from version 4.2 and later and Finder versions 5.3 and later. The only exception is System 6.0.0, which is incompatible because

of that version's sound problems with HyperCard. HyperComposer lets you play back from the beginning of any highlighted selection in any song and allows the standard Macintosh editing choices.

Quick Notes was one of several features the reviewer didn't mention: it allows the user to click on the keyboard or staff without first selecting note duration; holding down the mouse at that point scrolls through the duration choices for you. Also left out were Command Key Advance and Highlight Notes—options that address some of your criticisms of the program's editing and playback features.

Elizabeth Grose  
Addison-Wesley Publishing Company  
Reading, Massachusetts

We found Quick Notes and Command Key Advance to be minor conveniences that did not rate separate mention in the space available. While it's fair to blame HyperComposer's sluggish performance on HyperCard's own limitations, the fact remains that the program is slow enough to interfere with the creative flow of composing.—Ed.

## Shareware in the Wrong Hands

I have just finished reading Steven Levy's column "Hacker Hell" [*The Iconoclast*, October 1989]. Interestingly, I felt that not being free for all was the core problem with Educorp's distribution of the Chally Micro Solutions product HexFlags. I was actually able to purchase a copy of HexFlags from Educorp after Mr. Guzelimian said it had been removed from the library, though that may have been his oversight. Without disclosure of these issues in the column, my complaint seemed petty.

Exposure from public information services and publication (continues)

## Corrections

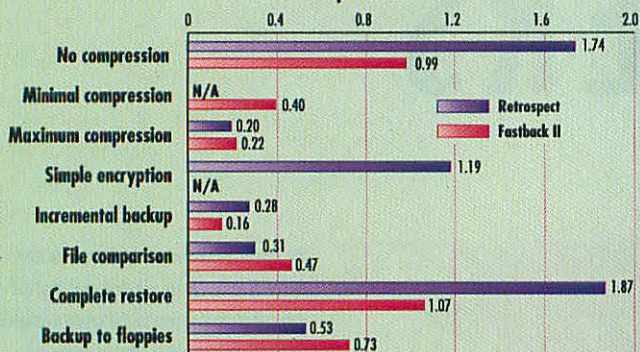
The phone number for Maxcess, maker of 150t (Where to Buy, December 1989), is 215/928-1213.

The phone number for NuEquation in Garland, Texas, maker of NuPaint (Where to Buy, December (continues))



## FASTBACK II VS. RETROSPECT

Measured in MB per minute



A speed comparison between these two backup utilities as it should have appeared in December 1989 Reviews (page 192).

1989), is 800/272-4663.

The price for MacTilt from Ergotron ("Mr. X's Xmas List," December 1989) is \$99.95.

The phone number for Nuvo Labs in San Luis Obispo, California, maker of FastTape

("Backing Up with Tape Drives," December 1989), is 805/544-5766.

Samba Bridge ("Network Connections," November 1989), an X.25 interface for Mac networks, is made by Access Priv-

This is a built-in Courier 14 pt  
And this is Helvetica Narrow 12 pt

This is an optional Palatino 12 pt

This is how 300-dpi output from the Hewlett-Packard DeskWriter (Reviews, page 206, December 1989) should appear. A 72-dpi screen image was inadvertently used in place of actual printer output.

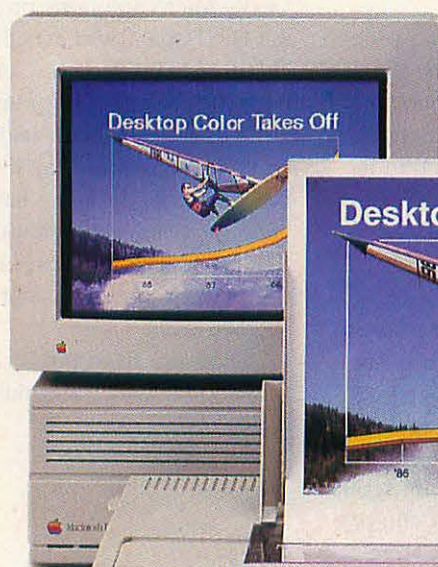
ilege, Sophia Antipolis, France, and is distributed in North America by Services T.I.C., 5253 Boulevard Decarie, #550, Montreal, Quebec H3W 3C3, Canada; 514/483-1294. It retails for \$2520 (U.S.).

The phone number for Decatblon, maker of Logo-Power and Logo SuperPower (New Products, December 1989), is 800/648-5646.

In the table "Encryption Products" on pages 148-149 ("Data Safety," January

1990), the product-made column headings "Deluxe" and "PC Tools Sentinel" should have read "PC Tools Deluxe" and "Sentinel."

cations such as Macworld may have done much to affect the business policies of Educop. I'm anxious to see if the change in policy will actually make a difference in Educop. (continues)



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corp's dealings with developers or if it was primarily rhetoric to lessen the intense heat of the moment.

Mark Chally

Chally Micro Solutions

West Covina, California

## Educorp Speaks Out

I applaud Steven Levy for addressing several shareware issues (*The Iconoclast*, October 1989). Educorp's new policy of sending letters to authors of freeware and shareware software requesting permission to distribute their products has worked very well. Authors have updated their products and have helped us provide better descriptions for our catalog.

Another policy reintroduced recently provides free software for shareware users who send in shareware registration fees. We are also publishing articles and biographies of shareware authors in our catalogs to promote recognition of and increase financial support for their efforts.

In addition, our catalog will include a column of tips to help shareware authors recover fees, such as providing an incentive for sending in the fee—full documentation, perhaps, or a new version of the software. Most important is the technical support an author can give registered users. We help with many problems, but for more in-depth assistance the author is the best resource.

Vabe Guzelimian

Educorp Computer Services

Solana Beach, California

## Two Views of Visionary

In response to Jerry Borrell's evaluation of Visionary software from Scitex [*Commentary*, October 1989]:

Visionary provides an excellent scanning application and complete importation of QuarkXPress files (although you cannot open a Quark file directly, you can export and/or cut and paste graphics and text to a Visionary page).

Object and window rotation, polygon tools, annotation layers, FPO masking, and the ability to incorporate EPS files directly into the Scitex page medium without external film plotting make the Visionary system unique. Visionary also lets you create Scitex continuous-tone (CT) images from Mac PICT and TIFF files.

I have had success VIPing QuarkXPress and PageMaker files into Scitex linework, performing trapping, and producing film. The Scitex output is clearer, and the trapping is impeccable; the Lino output has moiré patterns, the trapping is poor, and rarely are the separations in perfect registration.

One note to beware of concerning VIP: it only recognizes Adobe Redbook PostScript language. Also, the 255-color limitation that Jerry discovered has been a stumper for all Scitex VIP users, and I am researching two work-arounds at this time.

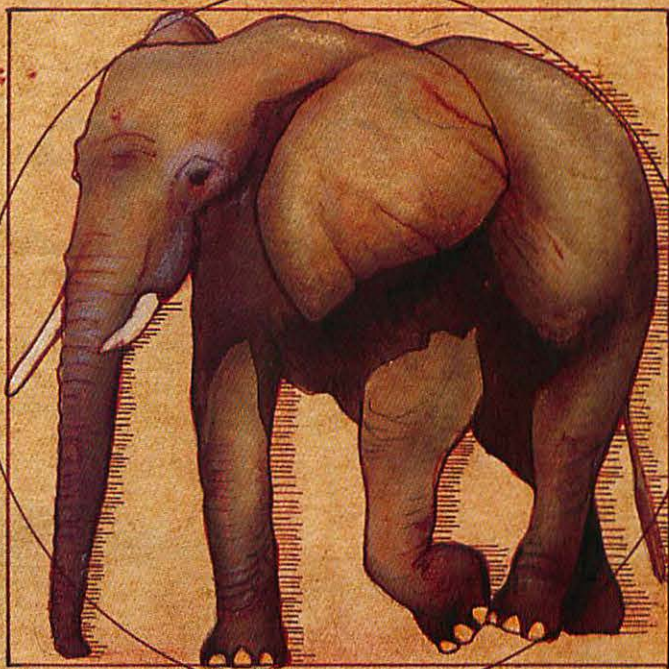
The first is to produce four separate PostScript files from Adobe Separator, run VIP on all four files, then place each file individually into the CMYK Scitex files as they go to plot. This provides for a measure of high quality, but trapping and retouching remain an issue.

The second approach is to produce four separate PostScript files from Adobe Separator, run VIP on all four files, and compose them on the Scitex Imager into a CT image. (continues)



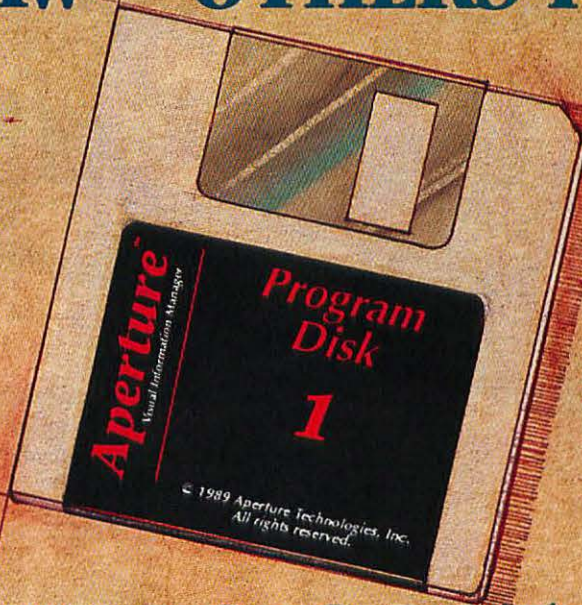


Leonardo da Vinci



**SOME DRAW OTHERS REMEMBER**

*Handwritten in red ink: "I don't know how to draw"*



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MACWORLD  
December, 1989



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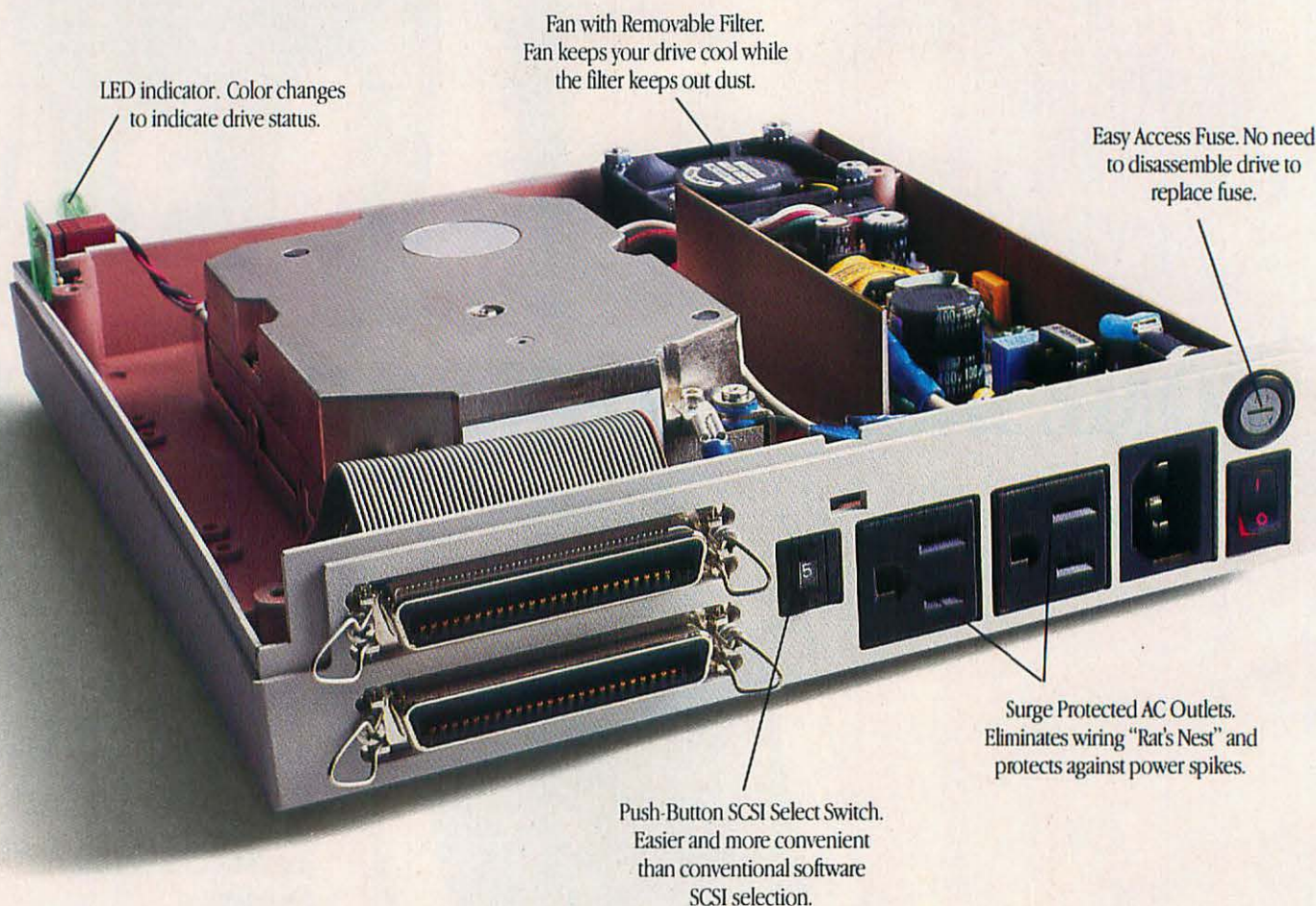
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# Value Is More Than



**B**uyer beware. There are those that would have you believe that all external hard drives are essentially the same. But smart consumers know that looks can be deceiving.

Everywhere there are companies touting products with the Jasmine look. Yet, while it's relatively easy to make a drive that *looks* like a Jasmine®, no one has come close to matching the superior design and value of the award-winning DirectDrive™ series.

## Below The Surface.

The real difference begins under the cover. Jasmine uses only the best drive mechanisms available. We've spent countless engineering hours working with the

top manufacturers around the world to bring you high quality, high reliability drives. In fact, Jasmine co-engineered the industry's first 70,000 hour MTBF (mean time between failure) mechanisms, which are fast becoming an industry reliability standard.

Superb mechanisms are just the beginning. Stringent incoming inspections and testing, a ten-point quality control procedure during assembly, 24 hour burn-in and post-assembly testing all add up to high reliability.



The Award-Winningest Drives—Jasmine has been honored by more industry awards than all other drive suppliers combined!



# han Skin Deep.

## The Side You Never See.

Take a look at the back of our drives and you'll see some of our exclusive design advantages. Like two switched surge protected AC outlets. Plus a push-button SCSI selector for fast, easy configuration. And our easy-access fuse is as simple to replace as a light bulb.

## Environmental Control.

Heat and airborne dust are the enemy of every piece of electronic equipment you own. If dust particles infiltrate your hard drive, failure is almost certain. That's why we incorporate a fan with a removable, washable filter for the ultimate in environmental control.

## The Brains Behind The Beauty.

Hardware is only part of the story behind Jasmine superiority. Our exclusive DriveWare™ Optimization Software provides improved drive performance, disk partitioning, password protection, automatic diagnostics and error correction, and A/UX compatibility.

## A Different Profile.

Our unique BackPac™ is an excellent example of Jasmine's innovative engineering. It attaches to the back of your Macintosh® Plus or SE series, adding high-capacity storage without cluttering

your workspace. And your system will still fit in most Mac carrying bags.

## Inner Beauty.

Installing your own internal drive is easy with Jasmine's universal InnerDrive™. It comes with brackets for every Macintosh CPU, so as you upgrade your system, you can take your Jasmine drive with you.

## Introducing Platinum Flower Service.

Jasmine built its reputation on providing a high level of service and support. And now we're setting a



new standard of excellence with our exciting Platinum Flower Service Program. Every drive we produce is accompanied by our unique Platinum Flower Package. Inside the package, you'll find tools and programs designed to keep your drive where it belongs, working with your Macintosh.

## And To Top It Off...

To make your Jasmine drive a complete storage system, we include some free extras. Like the acclaimed SUM II disk management software (a \$149 retail value). SUM II provides

data recovery, file encryption, disk optimization, and backup utilities.

Plus your drive comes loaded with 5MB of the latest ShareWare compiled from the library of the prestigious Berkeley Macintosh Users Group (BMUG). And a Hard Disk Encyclopedia, a complete set of cables and connectors, and an easy access termination panel.

All at no extra cost.

## It All Adds Up To Unmatched Value.

Add it all up: Superior features, Platinum Flower Service, SUM II, DriveWare, 30 day money-back guarantee, Two-year parts and labor warranty, and best of all, great pricing. It all adds up to the best hard drive value in the business.



Every Jasmine drive comes with DriveWare, ShareWare, and SUM II data protection and recovery utility.

Capacity	DirectDrive	InnerDrive	BackPac
20MB	\$ 449	—	—
40MB	\$ 599	\$ 599	\$ 699
80MB	\$ 849	\$ 849	\$ 949
100MB	\$ 999	\$ 999	\$1,099
130MB	\$1,199	\$1,199	\$1,299
180MB	\$1,499	\$1,499	\$1,599



## Jasmine

To Order, Call

# 1-800-347-3228

Visa, MasterCard, American Express and corporate purchase orders accepted.





Linework files are considerably higher in resolution than CT; however, a CT image results in blurry type due to the lower resolution and lack of trapping.

Alex Studer  
Graphic Arts Systems  
Burbank, California

As Jerry Borrell's column and Steve Roth's feature ("The Prepress Connection," in the same issue) point out, the desktop-prepress connection is far from seamless. Complete importation is not synonymous with cutting and pasting; nor is a multistep convert-and-reassemble process an elegant solution; we think Adobe PostScript interpreters should all be created equal; and we don't want labor- and dollar-intensive workarounds without trapping.—Ed.

#### Get What You Need

It took Thom Hogan's article "Macs, They Are A-Changin'" (State of the Mac, October

1989) to urge me to vent my wrath about the ultimate user-unfriendliness in the world's most user-friendly computer.

Consider these: System 7.0, megabytes of memory, and gigahertz of microprocessor speed, accompanied by hard disks of humongous storage capacity. "Mouth-watering goodies" always "just around the corner" costing ludicrously big bucks to us unsuspecting users. Yet my master's thesis, written with WordStar 3.3 on my old CP/M computer, was about 90K, while my doctoral dissertation, to be completed on my trusty Mac Plus with an inexpensive non-Apple external floppy, will not exceed 200K; a typical research quarterly report (including a couple of Excel data sheets), probably

not too dissimilar to any small business report, does not eat up more than 25 to 50K.

We average users are expected to "reach deep in [our] wallet (or credit limit)" and fork out huge amounts of money in pursuit of features we do not really need. What about an improved, faster, inexpensively enhanced Mac Plus, or even a 512K? When was the last time you—not the monster program or operating system you were using—needed more than 512K?

John A. Paravantis  
Evanston, Illinois

#### Hard-Disk Drive Mechanisms

Turning 40" in the September 1989 issue states that the PCPC MacBottom 45

uses a Seagate ST157N drive. The specifications on my MacBottom 45 (as indicated in a special Parameters, MacBottom Info file and as told to me by a PCPC sales representative) indicate that the drive is in fact a MiniScribe M8051-SCSI. Has PCPC perhaps recently changed its specifications or did someone simply not get the facts straight?

W. R. Maes  
Calgary, Alberta, Canada

Some vendors occasionally purchase drive mechanisms from more than one drive manufacturer. Vendors also occasionally drop one drive manufacturer in favor of another. Macworld always notes which mechanism was received and tested. When ordering a hard disk, or buying one from a dealer, it's always best to double-check



# Where will your electronic mail system



Some people see electronic mail as a simple desktop utility for shooting messages down the hall. Period.

Microsoft, however, sees it as a strategic business investment that should dramatically boost communica-

tion and productivity five minutes after installing it. And five years after running it.

Introducing Microsoft® Mail version 2.0—the only company-wide electronic mail system built so you won't outgrow it. Now you can instantly send messages and files Mac® to Mac, Mac to PC, Mac to



that you are getting the drive mechanism you want.—Ed.

### Pyro Illuminated

**R**obert C. Eckhardt did a great job of explaining the sometimes arcane subject of INITs ("Start with Utilities," October 1989), and I was delighted that Pyro, which I coauthored, made the "INIT Hall of Fame." However, the article erred in saying that Pyro users "must select options to monitor the Mac's serial and printer ports. . . . Otherwise, this screen saver will shut everything down when it darkens the screen." Pyro versions 1.0 and 2.0 had an Allow Background Tasks option, which enabled background software such as alarms and print spoolers to operate during screen

saves. We removed this option in Pyro 3.0 because it always allows background and application processing to continue during screen saving. The modem-input checking option is provided solely for users who do not want screen saving to start during an online session because they often read or scan incoming text. If screen saving were to start, it would hide the terminal-emulation window but would not otherwise interfere with the session. In Pyro 3.0, the printer-port check box is for users who have a modem connected to the printer port—it has nothing to do with printing.

*Steve Brecher  
Software Supply  
Sunnyvale, California*

### Government Issue

**Y**our item on products for government publishing [*Macworld News*, October 1989] contains a small error of nomenclature. The key standard for controlling document structures in the Department of Defense's CALS program is not a graphics language but a generalized language for describing structures of many sorts. The correct title is ISO 8879-1986, Standard Generalized Markup Language (SGML).

Incidentally, CAPS Author/Editor was developed by SoftQuad in Toronto, Ontario, Canada. And a second Macintosh product for editing SGML documents, Checkmark, has recently been released by Software Exoterica (383 Parkdale Ave., #406,

Ottawa, Ontario K1Y 4R4). SGML-based document management use is growing not only in the Department of Defense but also in other portions of the U.S. government, as well as the governments of Canada and Europe, and in scholarly publishing too.

*James David Mason  
Oak Ridge, Tennessee*

.....  
*Letters should be mailed to Letters, Macworld, 501 Second St., San Francisco, CA 94107, or sent electronically via CompuServe (70370,702) or MCI Mail (294-8078). Include a return address. We regret that, due to the high volume of mail received, we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld. ☐*



# System be five years down the road?

VAX®, potentially Mac to whatever. And, for the first time ever, you can send and receive mail directly from Macintosh® programs like Microsoft Excel and Microsoft Word—it's never been *this* convenient.

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# Tomorrow's Upgrade For Your Mac Is Only \$95\*

**MacWAREHOUSE SALE**

A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

## MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

## PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You don't even need a soldering iron. Just open your Mac, slide out the main circuit board, and plug in your memory card. Complete installation instructions are included with each memory kit.

## WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@ \$95 each).

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.
2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, Ix, Ix/cx, or SE30 to this amount of memory	Do this: (install in multiples of four only)
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
8 MB	Remove all four 256K SIMMs install eight 1M SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool — it's available from us as part of a handy tool kit for just \$15.

## WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single In-line Memory Modules). Each one megabyte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

\*Prices can vary a lot, based on quality, speed and demand. At press time

our price for 1MB, 120 ns Samsung kits is \$95. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

## SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

## OVERNIGHT DELIVERY

Place your order by 12:00 a.m. (E), weekdays and we'll deliver overnight for just \$3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

**MacWAREHOUSE**  
**1-800-255-6227**

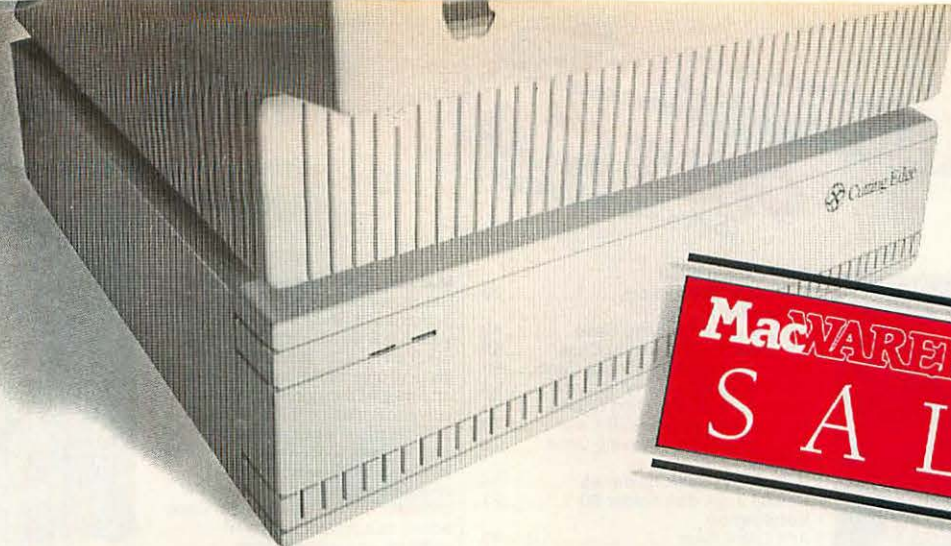
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Inquiries 1-201-367-0440  
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## MACWAREHOUSE 30 DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your MacWarehouse Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return the product, postage paid, in its original condition, with the original packaging and documentation.

**ONE YEAR WARRANTY.** MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.





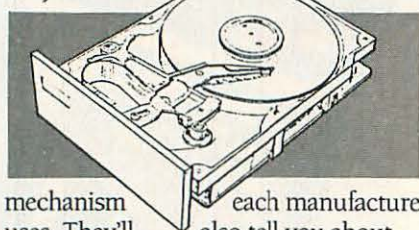
# Buy a Hard Drive Now And Save Up To \$300

"The best deal in hard drives just got better!"

Between now and February 28th, MacWarehouse is offering savings on every hard drive we sell. So, if you're thinking of buying a new hard drive, your timing couldn't be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart.

We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Dolphin, PLI Infinity Turbo and others — all at unheard of low prices.

Let our helpful sales staff take the hassle out of buying a drive. They'll tell you which drive



mechanism each manufacturer uses. They'll also tell you about access speed, reliability, software and the manufacturer's warranty.

## MONEY BACK GUARANTEE

They'll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you're not 100% satisfied,

## LIMITED TIME OFFER

MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are the savings from pre-holiday prices. (This is a limited time offer, valid

through February 28, 1990.) Overnight delivery is just \$3, anywhere in the Continental United States.

So call us now and tomorrow morning you'll be up and running with the best hard drive deal in the business!

	20 + MB		30 + MB		40 + MB		60 + MB		80 + MB		***40 + Removable	
	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE
Cutting Edge	359	\$80	479	\$20	525	\$24	609	\$20	699	\$40	829	\$70
CMS, MacStack	459	\$70	499	\$46	599	\$26	649	\$50	769	\$30	839	\$36
Dolphin, Integra	429	\$70	479	\$116	549	\$170	615	\$163	695	\$300	879	\$260
PLI, Infinity Turbo	-	-	569	\$20	619	\$26	-	-	-	-	1098	\$21
*Quantum Internal	-	-	-	-	499	\$26	-	-	829	\$40	-	-

Savings are calculated from MacWarehouse December 1989 published prices. \*Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for \$39. \*\*PLI is a 50meg turbo drive. \*\*\*40 + meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

just return it to us within thirty days and we'll refund your money.

Then there's the MacWarehouse Loaner Drive Program. Buy from MacWarehouse and if you ever have a problem, you won't be without a drive for more than a few hours.

## READY TO USE

A hard drive from MacWarehouse couldn't be easier to use. We'll tell you which ones come pre-formatted — ready to use right out of the box. You just plug in, turn on your Mac and go!

If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.

**MacWAREHOUSE**  
**1-800-255-6227**

Call toll-free  
Twenty-four hours a day,  
seven days a week.  
Inquiries 1-201-367-0440  
Fax 1-201-905-9279

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## MacWarehouse 30-Day Money Back Guarantee

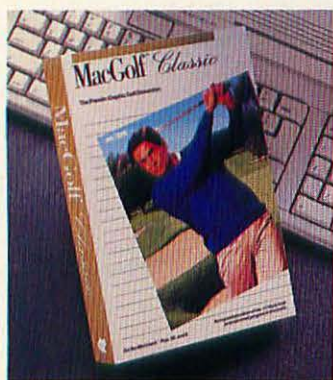
Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.



**OVERNIGHT DELIVERY**  
**ONLY \$3.00**  
 (See details below)

## GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.



### MacGolf Classic (XOR Corp.)

You won't be in the rough when you play MacGolf. This is the premium edition of MacGolf, featuring vivid full-screen color graphics with unsurpassed screen image detail. Contains the original 2 MacGolf courses and 4 additional MacCourses, for a total of 108 holes to play. New features include 5 enlargement options for close-up viewing, 9 practice greens, a driving range, installability on hard disks and much more. Plus, SE, and II. (entertainment) \$53.

## ACCESSORIES

<b>Apple</b>	
Toner Cartridges LaserWriter .....	115.
<b>Avery Labels (full line available)</b>	
Color Coded 3.5 Diskette .....	4.
Laser 3.5 Diskettes .....	29.
Laser File Folders .....	6.
Laser Transparencies .....	22.
<b>Basic Needs, Inc.</b>	
HardTop Keyboard Covers .....	15.
HardTop ImageWriter Covers .....	17.
Keyboard Flip .....	6.
Dust Covers - Grey Nylon Ripstop	
ImageWriter or LaserWriter .....	12.
Mac Plus and keyboard .....	11.
Mac SE and extd. or reg. keyboard ..	11.
Mac II and extd. keyboard .....	12.
Universal Laser Printer Stand .....	28.
<b>Computer Lenders, Inc.</b>	
MacInker (IW & IW II) .....	41.
<b>Curtis</b>	
Computer Tool Kit (52 pc.) .....	49.
Curtis Clip .....	6.
Disk Holder (holds 40) .....	9.
Jewel Surge Suppressors .....	Call.
<b>Ergotron</b>	
MacTilt-SE .....	68.
MacTilt II-RGB .....	75.

<b>Goldstein &amp; Blair</b>	
The Macintosh Bible .....	20.
<b>I/O Designs</b>	
Imageware II Carrying Case .....	49.
Macinware IIcx Carrying Case .....	85.
Macinware Mac II Carrying Case .....	99.
Macinware Plus Carrying Case .....	64.
Macinware SE Carrying Case .....	75.
Monitorware Apple RGB Case .....	79.
The Ultimate SE Carrying Case .....	79.
<b>Kalmar</b>	
Rolltop Teak disk holder 45 .....	14.
Rolltop Teak disk holder 90 .....	21.
<b>Kensington</b>	
Anti-Glare Filter .....	33.
Apple Security Kit .....	34.
Mac II Stand w/Cable Kit .....	64.
MasterPiece Mac II .....	105.
PowerBacker 360 UPS Line .....	269.
PowerBacker 800 UPS Line .....	749.
PowerBacker 1200 UPS Line .....	949.
System Saver .....	63.
<b>Mobius Products</b>	
Fanny Mac QT .....	59.
SE Silencer .....	39.



### GOfer (Microlytics)

The ultimate text finder. A powerful software utility that searches, finds and retrieves text. Searches through countless files on your hard disk drive or floppy disks to find the text you need. A phrase, a fact, a note, a date. If you need it, GOfer finds it in seconds. You can automatically import the section of text into the document you're currently working in. You save hours searching through files. GOfer operates as a Macintosh desk accessory. (utilities) \$47.

<b>Polaroid</b>	
Circular Polarizing Filter .....	35.
<b>Read-Write</b>	
CompuDuster .....	29.
Kleen & Dry CRT Pads .....	5.
Computer Care Kit .....	45.

### Macinware Carrying Cases (I/O Designs)

The I/O family of carrying cases protects your Mac and it's peripherals against damage whenever you need to take your Mac on the road. The outer covering is made of luggage quality lightweight woven nylon with web strap reinforcement.

The SE Extended Case has an inside padded compartment that can accommodate the extended keyboard. The interior is padded to protect the equipment. Comes in Black or Navy. (accessories) SE Extended Case \$75.

### MacSnap 524S and 548S (Dove)

Get an unbeatable combination of performance and productivity for your 512E with Dove's MacSnap 524S and 548S. MacSnap 524S gives you versatility by combining one meg of memory with the universally compatible MacSnap SCSI interface and external port. And for even more system flexibility, MacSnap 548S features SCSI complete with two of RAM for the ultimate 512E enhancement. Enjoy access to a greater variety of software and improve your performance in a Snap! (memory) **MacSnap 524S-\$239.**  
**MacSnap 548S-\$499.**



### Smack-a-Mac

Smack-a-Mac .....	9.
<b>SoundSight</b>	
FastKeys 2.0 .....	35.
<b>Targus, Ltd.</b>	
Deluxe Plus/SE-XKB Case (black) ..	69.
ImageWriter II Case (black) .....	45.
Mac Plus/SE Case (black) .....	55.

## ACCOUNTING AND PERSONAL FINANCES

<b>Aatrix</b>	
Checkwriter .....	37.
Payroll 3.5 .....	109.
Payroll PLUS or TimeMinder ..	ea.149.
<b>Bedford (Computer Associates)</b>	
Simply Accounting .....	219.
<b>Brown-Wagh Publishing</b>	
MacLedges .....	159.
Service Industry Accounting .....	209.
<b>DAC</b>	
Dac-Easy Light .....	42.
<b>Intuit</b>	
Quicken 1.5 .....	36.
<b>Layered, Inc.</b>	
at Once! .....	289.

### Casino Master (Centron)

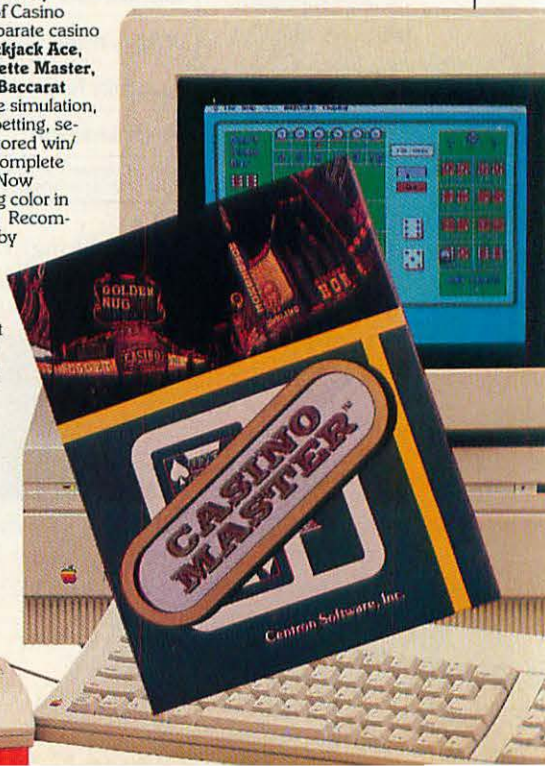
Become a Master of Casino Gambling! Five separate casino games include **Blackjack Ace, Crapsmaster, Roulette Master, POKERMASTER, and Baccarat Master.** Exact table simulation, mouse controlled betting, selectable bankroll, stored win/lose statistics and complete manual included. Now available in dazzling color in the Mac II version!! Recommended and used by professional gamblers! (entertainment) Buy individual games for \$27. each or get the 5 game Casino Master Package for \$49. or the Deluxe Mac II color version for \$55.

### MECA

Managing Your Money .....	124.
<b>Monogram</b>	
Business Sense .....	269.
Dollars and Sense .....	81.
<b>Nolo Press</b>	
For The Record .....	29.
WillMaker .....	32.
<b>Reality Technologies</b>	
WealthBuilder .....	165.
<b>ShopKeeper Software</b>	
Bill-It 2.0 .....	99.
<b>Software</b>	
MacInTax Federal '89 - 1040 .....	65.
State supplement .....	ea. 56.
Taxview 1040 .....	309.
<b>Survivor</b>	
MacMoney 3.5 .....	60.

## BLANK MEDIA

<b>B.A.S.F. made in U.S.A</b>	
DS/DD (box of 10) .....	15.
DS/High Density (1.44 Meg) .....	29.
<b>Peripheral Land, Inc.</b>	
Turbo 40 Cartridge .....	115.
<b>Sony</b>	
DS/DD (box of 10) .....	14.





# Win

# The Mac Portable!

It's here at last. It has all the attributes of your own machine, plus awesome new screen technology, (fifty percent larger than the SE screen), 6 - 12 hour rechargeable batteries and a built in optional 40MB hard disk. Imagine all the power and convenience of your Mac in a 15.7 pound portable package.

And you can win the new Macintosh Portable by entering the MacWarehouse PORTABLE COMPUTER GIVEAWAY.



Your name is automatically entered into the drawing when you order from MacWarehouse. (Or just mail in the Entry Coupon.)

And don't forget, absolutely nobody beats MacWarehouse for great prices, free technical support and fast, dependable, OVERNIGHT service. You won't find a better source for your Macintosh needs.

The New MacPortable  
**1st PRIZE**  
Prizewinner

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We carry more than 1200 Macintosh products, including all the latest releases and new versions. We pride ourselves on getting new products first. If you can't find what you need, call us for a free copy of our latest catalog.



**MacInTax Federal '89-1040 (Softview)**  
MacInTax Federal '89-1040 guides you through the process of preparing your Federal Taxes (eight state tax modules also available at \$56 ea.). Just type in the requested numbers, and MacInTax does the rest. When finished, print the completed return on the LaserWriter or the ImageWriter. If you used MacInTax last year, it reads those files and brings forward relevant items, saving time and reducing errors. Its tax planner shows the effects of various tax strategies. (finance) \$65.

## Aperture Visual Information Manager (Aperture Technology)

Aperture moves Macintosh graphics into a new dimension by integrating a precision drawing system with a powerful database manager. Aperture allows you to create detailed drawings, attach data to objects in your drawings, produce reports, link drawings together, and display data on your drawings to form complete applications. Whether you are an architect, engineer, designer, space planner, facilities manager, or someone who needs to communicate complex ideas and information, Aperture will become your program of choice. (graphics) \$729.



## Panorama (ProVUE)

Panorama combines the speed and simplicity of a spreadsheet with a forms generator, an outliner, and business graphics. Think of it as a database manager that looks like a spreadsheet. It's a macro recorder simplifies common operations. It can turn any ordinary database into an outline with up to seven levels. Panorama also creates personalized form letters (and mailing labels) without a separate word processor. Winner of 1988 MacUser Eddy Award. (database) \$205.



## OFFICIAL ENTRY COUPON

MWB0

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1690 Oak Street, P.O. Box 1579, Lakewood, NJ 08701

When you order by phone or mail, you are automatically entered in the drawing. You can also mail this coupon or call our contest entry line. 1-800-367-0787. (In CT., call 1-203-852-8968)

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# FROM MacWAREHOUSE™



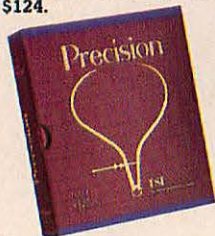
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A responsive spaceflight and docking simulator designed for all who've wondered at the stars, at the motions of objects in orbit, and about what it would be like to fly a spacecraft in orbit. (entertainment) **\$29.**



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A fully integrated software program addressing every aspect of personal and small business finance. Write and print checks, set up a personal budget, estimate your taxes and more. (finance) **\$124.**



## Precision

High performance 2-1/2D CADD solution for the Macintosh. This full featured package offers extensive drawing and editing features such as global replace symbols, in-depth analysis, powerful macro files and complete dimensioning capabilities. Includes complete range of plotter drivers, import/export utilities for DXF and IGES files, architectural and mechanical symbol file kit. (cad/cae) **\$155.**



## Virex 2.1

Virus detection and treatment software. Intended for individuals that have unusually high risk of exposure to viral infections including Fortune 500 companies, and desktop publishing firms. Useful for those who use public domain software or networks. (security) **\$55.**

## DESKTOP PUBLISHING

<b>Aapps</b>	
MicroTV .....	289.
<b>Aldus</b>	
PageMaker 3.02 .....	385.
PageMaker Color Extension .....	149.
<b>Broderbund</b>	
DTP Advisor .....	47.
<b>Data Translation</b>	
PhotoMac .....	609.
<b>Emerald City Software</b>	
Smart Art I, II, or III .....	ea. 85.
<b>Icom Simulations</b>	
MacKern .....	119.
<b>Letraset</b>	
ColorStudio or FontStudio .....	Call.
ImageStudio .....	275.
Ready, Set, Go! .....	275.
<b>Olduvai</b>	
Plus 1.1 .....	95.
Read-It! 2.1 (OCR) .....	249.
Read-It! Personal 2.0 .....	125.
Read-It! TS (ThunderScan) .....	79.

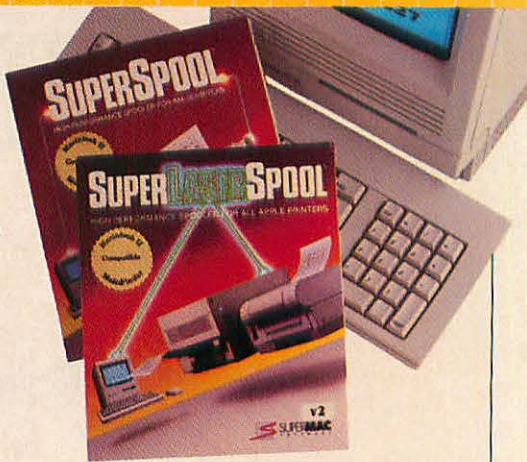
## SuperSpool/SuperLaserSpool (SuperMac)

SuperSpool for direct Connect ImageWriters and SuperLaserSpool for all networked or non-networked Apple printers, are best-selling print spoolers that let you work and print at the same time. The fastest spoolers available. Can handle large and complex graphics, spreadsheet or database documents. Special desk accessory allows you to see and manipulate the print queue; delete documents, re-order documents to another printer. (utilities)

### SuperSpool-\$58.

### SuperLaserSpool (single-user) -\$89.

(5-pack) -\$295.



## MiniCad+ 2.0 (Graphsoft)

This year MiniCad+ is the people's choice, winning both the U.S. and Aus-tralian MacWorld World Class Awards for CAD. For the price of most 2D CAD packages, MiniCad+ provides 2D, 3D, a hotlinked spreadsheet and a programming language. The quality is unsurpassed. (cad) **\$519.**

## Blueprint

This new professional-level 2D CAD program has it all at an unbelievable price. Layers, fillets, DXF, constraint palette, high precision, auto-dimensioning, hatching, symbol library, encapsulated postscript plus more. (graphics) **\$349.**

<b>Quark</b>	
QuarkStyle .....	169.
Xpress .....	459.
<b>Springboard</b>	
Springboard Publisher II .....	109.
<b>TimeWorks</b>	
Publish-It! .....	225.

## DISK DRIVES/BOARDS

<b>Aristotle Industries, Inc.</b>	
HardPac Mac 20 Meg .....	469.
HardPac Mac 40 Meg .....	749.
HardPac Mac 80 Meg .....	1089.
HardPac Mac 105 Meg .....	1229.
<b>CMS</b>	
MacStack 20 Meg .....	459.
MacStack 30 Meg .....	499.
MacStack 45 Meg .....	599.
MacStack 60 Meg .....	649.
MacStack 80 Meg .....	769.
<b>Cutting Edge</b>	
800K External Floppy Drive .....	149.
SyQuest Removable 45 Meg .....	829.
Under the Mac 20 Meg .....	359.
Under the Mac 30+ Meg .....	479.
Under the Mac 45+ Meg .....	525.
Under the Mac 60+ Meg .....	609.
Under the Mac 80+ Meg .....	699.
<b>Dayna Communications</b>	
Dayna File Single 360K (5 1/4") .....	525.
Dayna File Dual 360K & 1.44M .....	729.

## Dolphin Systems Tech

Integra 20 Meg .....	429.
Integra 30 Meg .....	479.
Integra 40 Meg .....	549.
Integra 60 Meg .....	615.
Integra 80 Meg .....	695.
Flipper 44 Meg .....	879.

## Fujitsu

800K Disk Drive .....

175.

## Kennect Technology

Drive 2.4 .....

339.

Rapport .....

209.

## PCPC

MacBottom Hard Drives .....

Call.

## Peripheral Land, Inc.

Infinity Turbo 40 Meg .....

1098.

Turbo Floppy 1.4 .....

359.

## Quantum

Quantum 40 MB Raw Drive .....

499.

Quantum 80 MB Raw Drive .....

829.

## RasterOps

RasterOps Colorboard 264 .....

760.

## WealthBuilder (Reality Technologies)

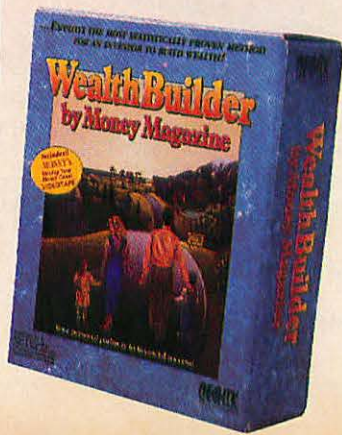
Turn your Mac into your own financial planner. Taking into account your financial profile, the goals that you want to accomplish and the risk that you are willing to assume, WealthBuilder searches for the best investments available to fulfill your objectives. The program also allows you to change any information or assumption and immediately view its impact on your overall financial picture. Wealthbuilder is your personal tool to a brighter financial future. (finance) **\$165.**

## EDUCATIONAL/PERSONAL

<b>Beacon Technology</b>	
GEMS of the Word .....	25.
<b>BrightStar</b>	
Alphabet Blocks 3.01 .....	30.
Talking Tiles .....	27.
<b>Bootware Software</b>	
ResumeWriter Pro .....	58.
<b>Davidson</b>	
Math Blaster .....	27.
Speed Reader II .....	27.
<b>First Byte</b>	
The Dinosaur Discovery Kit .....	27.
The Puzzle Storybook .....	27.
The Rhyming Notebook .....	27.
<b>Fair Tide Technologies</b>	
Navigatel mono .....	199.
<b>Help Software, Inc.</b>	
Desktop Help for Excel .....	50.
<b>Learning Company</b>	
Math Rabbit .....	31.
Reader Rabbit .....	37.
<b>MicroTech</b>	
Elementary Signer .....	49.
Finger Speller .....	29.
<b>The Software Toolworks</b>	
Mavis Beacon Teaches Typing .....	32.
<b>Visionary Software</b>	
Synchronicity .....	39.
<b>Voice &amp; Video Instruction Videos</b>	
HyperCard or Pagemaker 3.0 .....	ea. 35.
Word 4.0 Video Tape .....	35.

## ENTERTAINMENT

<b>Access Software, Inc.</b>	
World Class Leader Board .....	27.
<b>Artworx</b>	
Bridge 6.0 .....	24.
Daily Double Horse Racing .....	19.
GrailQuest .....	19.
<b>Broderbund</b>	
Ancient Art of War At Sea .....	27.
Shufflepuck Cafe .....	24.
Where in the World is Carmen .....	27.
<b>Bull City Software</b>	
Moriarty's Revenge .....	36.





# MORE FOR YOUR MONEY...

## BUSINESS AND PRESENTATION

<b>A Lasting Impression</b>	
ResumExpert (word vers.) .....	39.
<b>Adobe Systems, Inc.</b>	
TrueForm SetUp .....	225.
<b>AEC Management Systems</b>	
FastTrack Schedule .....	115.
<b>Aldus</b>	
Persuasion 2.0 .....	339.
<b>Antic Software</b>	
FlexForm Bus.Temp Vol 1 or 2 ...ea.	49.
<b>Ashton-Tate</b>	
Full Impact .....	249.
<b>Avery</b>	
List & Mail .....	79.
<b>Claris</b>	
MacProject II .....	375.
SmartForm Designer w/Assistant ...	295.
<b>Cognition Technology</b>	
MacSMARTS PRO .....	249.
<b>Cricket (Computer Associates)</b>	
Cricket Graph 1.3 .....	115.
Cricket Presents .....	285.
<b>HyperPress Publishing</b>	
Intelligent Developer .....	219.
<b>Informix</b>	
WingZ 1.1 .....	269.
<b>Microsoft</b>	
Excel 2.2 or PowerPoint 2.1 ....	ea.249.
The Microsoft Office .....	529.
Works 2.0 .....	185.
<b>Portfolio Systems</b>	
Dynodex-Instant Address Book .....	89.



### Felix (Altra)

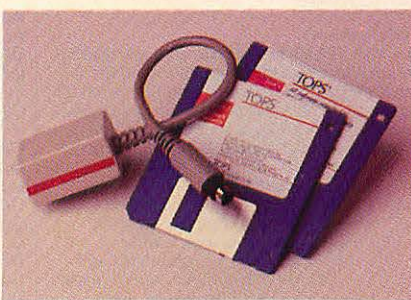
Finally, a stationary mouse alternative that's quicker and easier to use. Felix uses just six inches square of desktop to provide full screen cursor control. It utilizes Altra's "Optical Pointing Technology" and an onboard microprocessor to achieve very high resolution combined with simple use. Felix increases your daily output, so Felix is more than a mouse, it's a productivity tool! No maintenance required. For all Mac SE's and II's. (input) **\$127.**

### Power Up

Address Book Plus .....	53.
Address Book Plus w/Binder .....	99.
Calendar Creator .....	38.
FastForms! .....	89.
<b>Preferred Publishers</b>	
Direct Mail .....	54.
<b>ProPlus</b>	
Wall Street Investor .....	449.
<b>Satori</b>	
Bulk Mailer 3.2.3 .....	78.
<b>Softstream International</b>	
Endeavour Planner .....	95.
<b>Symantec</b>	
More II 2.01 .....	279.
<b>Symmetry</b>	
KeyPlan .....	339.
<b>Synex</b>	
MacEnvelope 4.1 .....	65.
MacEnvelope Plus .....	149.
MacPhonebook .....	40.
<b>Vertical Solutions</b>	
FastLabel .....	49.

### TOPS Network Bundle for the Macintosh (TOPS)

The TOPS network allows you to quickly and easily share files, electronic mail and printers between your Apple Macintosh, IBM PC and Sun Workstation. It includes all the software necessary to get your Macintosh working for you, sharing data, accessing multi-user applications, and sending electronic mail. All of TOPS functions are completely user-implementable, saving you time and money. (networking) **\$189.**



## CAD/CAE

<b>Claris</b>	
ClariscAD .....	595.
<b>Generic Software</b>	
Generic CADD Level 1 .....	85.
<b>Graphsoft</b>	
MiniCad+2.0 .....	519.
<b>Innovative Data Design</b>	
MacDraft .....	144.
Dreams .....	269.
<b>I.S.I.</b>	
Precision .....	155.
<b>Strata</b>	
StrataVision 3D .....	375.

## COMMUNICATIONS

<b>CE Software</b>	
In/Out (1 to 5 Users) .....	129.
QuickMail 2.0 (1-10 Users) .....	249.
<b>CompuServe</b>	
CompuServe Navigator 3.0 .....	39.
CompuServe Subscription Kit .....	9.95
<b>DataVIZ</b>	
MacLink Plus w/Cable 4.1 .....	125.
MacLink Plus/Translators 4.1 .....	99.
<b>Dow Jones</b>	
News/Retrieval Membership .....	24.
<b>FreeSoft</b>	
White Knight 11.0 .....	89.
<b>Hayes</b>	
Smartcom II 3.1 .....	87.
<b>InSignia Solutions</b>	
Soft PC (Mac II) .....	245.
<b>MetaComet</b>	
AccuWeather Forecaster .....	58.
<b>Prodigy</b>	
Mac Starter Kit .....	30.
<b>Prometheus</b>	
Acknowledge .....	289.
<b>MACKNOWLEDGE</b> .....	149.

<b>Software Ventures</b>	
Microphone II v.3.0 .....	219.
<b>Traveling Software</b>	
Lap-Link .....	81.

## DATABASE SOFTWARE

<b>Acius</b>	
4th Dimension 2.0 .....	469.
<b>AEC Management Systems</b>	
AEC Information Manager .....	409.
<b>Blyth</b>	
Omni 5 .....	359.
<b>Claris</b>	
FileMaker II .....	225.
<b>Fox Software</b>	
FoxBASE+Mac .....	295.
<b>Microsoft</b>	
File 2.0 .....	125.
<b>Odesta</b>	
Double Helix III .....	329.
GeoQuery .....	199.
<b>ProVUE</b>	
Panorama .....	205.

## DESK ACCESSORIES

<b>Casady &amp; Greene</b>	
QuickDEX .....	31.
<b>JAM Software</b>	
Smart Alarms & Appt. Diary .....	49.
Smart Alarms (1 - 4 users) .....	99.
Smart Alarms (5 - 8 users) .....	149.
Smart Alarms (9 - 16 users) .....	199.
<b>Preferred Publishers</b>	
Database .....	69.
Vantage .....	54.
<b>Solutions</b>	
SmartScrap & The Clipper 2.0 .....	45.

### Dynodex-Instant Address Book

Fast on-line address database that prints elegant, double-sided address pages for Filofax, Day-Timer, and most organizer systems. Includes binder, divider tabs, and 100 sheets of "no-fuss" laser paper. Pre-perforated and punched to tear easily into the correct size pages. Powerful database functions include find, sort, select, import, export, merge, auto-dial, and much more (business) **\$89.**



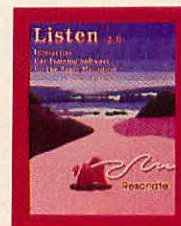
### Endeavour Planner

Endeavour Planner puts you in charge of complicated projects. Its easy to use GANTT chart display lets you point, click and drag on any item. Each project can have its own calendar. You can adjust schedules mid-stream when conditions change, or lock in fixed deadlines. (business) **\$95.**



### Listen

Complete ear training software package. Teaches note, chord and interval recognition. Adjustable levels of difficulty for beginners to professionals. Uses on screen piano and guitar or external MIDI keyboard. (music) **\$62.**



### Images with Impact!

**Accents & Borders 1**  
New from 3G Graphics! Choose from over 250 borders, frames, ornaments, labels, and symbols of food, music, holidays, sports, animals, and more. Easily customize, mix and match, and color. Free color disk for registered users. (graphics) **\$65.**



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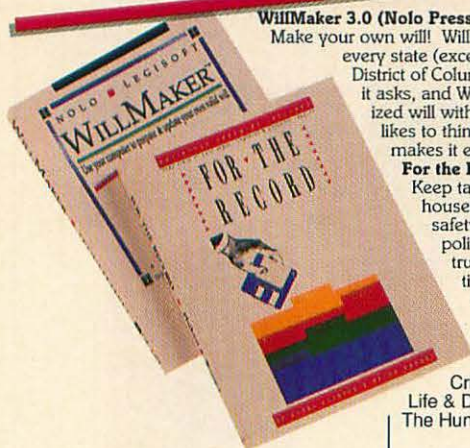
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# GUARANTEE

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## WillMaker 3.0 (Nolo Press)

Make your own will! WillMaker's documents are valid in every state (except Louisiana), including the District of Columbia. Just answer the questions it asks, and WillMaker constructs a personalized will with full legal standing. No one likes to think about a will but Willmaker makes it easy. (finance) \$32.

## For the Record 1.02

Keep tabs on essential items like household inventory, locations of safety deposit boxes, insurance policies, names of guardians and trustees. It compiles every critical tidbit into a neatly organized database (finance) \$29.

Cribbage & Gin King .....	34.
Life & Death .....	32.
The Hunt for Red October .....	32.

## Fonts

### Adobe

Adobe Type Manager .....	56.
ATM Plus Pack .....	109.
Fonts (full line avail.) .....	Call.
Forms and Schedules .....	279.
Newsletters .....	229.
Presentations .....	279.
Textures, Fills, and Patterns .....	129.

### Altsys

Fontastic Plus 2.02 .....	52.
The Art Importer 2.0 .....	89.

### Emerald City Software

Type Align .....	62.
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### Letraset

LetraStudio .....	275.
LetraFonts (various) .....	ea. 69.

### Tactic Software

ArtFonts Vol.1, 2 or 3 .....	ea. 55.
Orange Micro .....	69.
Alphabits .....	69.

### Bullseye

Ferrari Grand Prix or P51 .....	ea 32.
Fokker Tri-plane .....	24.

### Centron Software, Inc.

BlackJack or CrapsMaster .....	ea 27.
CasinoMaster (5 pack) .....	49.

### Discovery Software

Arkanoid .....	26.
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### Electronic Arts

Chuck Yeager Adv. Flight Trainer .....	32.
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### Miles Computing

Fool's Errand .....	32.
Puzzle Gallery .....	27.

### Mindscape

Balance of Power, Deja Vu .....	ea. 30.
Hostage .....	30.
The Colony or Gauntlet .....	30.

### Nemesis

Go Master .....	49.
Joseki Tutor .....	30.



## Swivel 3D • Studio/8 • Studio/1 (Parcomp & Electronic Arts)

**FREE OFFER!** Buy Studio/8 and Swivel 3D and get Studio/1 **Free!** Use Swivel 3D to create 3D objects and Studio/8 to add full-color backgrounds and touch-up. Use

Studio/1 to animate your 3D objects in b/w. Ideal for prototyping, architecture and product design. (graphics) Purchase Studio/8 and Swivel 3D for \$624 and get Studio/1 **FREE!** (A \$149.95 value.)

## GRAPHICS AND DESIGN

### 3G Graphics

Images w/Impact .....	52.
Graphics & Symbols 1 .....	65.
Business 1 .....	65.
Accents & Borders 1 .....	65.

### Adobe

Illustrator 88 .....	279.
Photoshop .....	Call
Streamline .....	229.

### Aegis Development, Inc.

Showcase F/X .....	199.
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### Aldus

Freehand 2.0 .....	345.
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### PCAI/XOR

Lunar Rescue or MacGolf 2.0 .....	34.
MacGolf Classic .....	53.
Road Racer .....	39.
NFL Challenge .....	54.

### Spectrum HoloByte

Falcon 2.0 .....	31.
Tetris color version .....	24.

### Springboard

Hidden Agenda .....	36.
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### Studio Zero

Orbital Mech .....	29.
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### The Software Toolworks

ChessMaster 2100 .....	32.
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# OVERNIGHT DELIVERY ONLY \$3.00

## Aperture Technology

Aperture Visual Information Mgr. ....	729.
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## Broderbund

Drawing Table .....	75.
TypeStyler .....	129.

## Casady & Greene

Vivid Impressions Vol. 1 .....	67.
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## Claris

MacDraw II .....	295.
MacPaint 2.0 .....	95.

## Cricket (Computer Associates)

Cricket Color Paint .....	179.
Cricket Draw .....	139.

## Deneba

Canvas 2.0 .....	169.
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## Dream Maker

Cliptures, Business Images .....	69.
MacGallery .....	27.

## Electronic Arts

Studio/1 .....	97.
Studio/8 .....	299.

## Graphsoft

Blueprint .....	349.
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## Innovative Data Design

Dreams .....	269.
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## MacroMind

MacroMind Accelerator .....	139.
MacroMind Director .....	445.

## VideoWorks II

.....	175.
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## Metro ImageBase

(Full Line Available)	
Art Deco or ReportMaker .....	ea. 76.
Newsletter Maker or Business .....	ea. 76.

## Mindscape

ZING .....	139.
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## Multi Ad Services

ProArt: Bus., Sports or Holidays .....	ea.95.
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## Paracomp

ModelShop .....	399.
Swivel 3D 1.1 .....	319.

## Select Micro Systems

MapMaker 4.0 .....	245.
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## Silicon Beach

Digital Darkroom .....	249.
Super 3D 2.0 .....	315.
SuperPaint 2.0 .....	125.

## SuperMac

PixelPaint 2.0 .....	225.
PixelPaint Professional .....	395.

## Tactic Software

Art Clips Vol. 1 .....	51.
Art Clips Vol. 2 .....	65.
SoundClips Vol. 1 or 2 .....	ea. 49.

## Zedcor

Desktop 2.0 .....	65.
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## HARDWARE AND PERIPHERALS

### Cutting Edge

Two Page Monochrome Monitor .....	999.
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### DEST

Dest PC Scan Plus .....	<b>SPECIAL</b> 699.
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## Macintosh SE/Plus w/Extended

### Keyboard Carrying Case (Targus)

Pamper your Mac with a Targus carrying case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens.

Full Targus Macintosh line. Some available in black, blue, burgundy, and platinum. (accessories) \$69.



## MacPhonebook 2.0

Organize your database of names, addresses and phone numbers by category. Print phone books in three sizes. List capacity of 1500 names. Import/export lists. Comes with little black covers. Fully compatible with MacEnvelope. (business) \$40.



## Dust Covers

Basic Needs dust covers look great! Machine stitched and custom fitted. The covers are made from washable rip-stop nylon and won't crack, yellow, or fade like similarly priced vinyl. (accessories) **Starting at \$11.**



## CanOpener

Information retrieval utility for the Mac. CanOpener will search anywhere, and lets you retrieve just about anything; including text, pictures and sounds. Locates text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in it's library, so the next time you need it, it's just a click away. (utilities) \$65.







## Mac-101 Keyboards (DataDesk International)

Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Manufacturer's two year warranty. (input/output) \$139. International Versions also available.



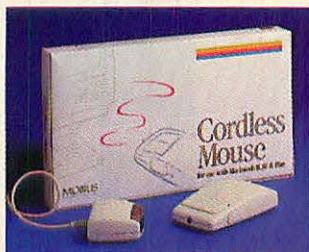
## ProModem 2400M

The ProModem 2400M provides a complete communications package for your Macintosh. Operates at 2400, 1200 and 300bps and includes MAC-KNOWLEDGE and cable. MAC-KNOWLEDGE is the first Macintosh software program that manages to simplify the task of communicating. Click on icons to configure your mode, log onto major online services or send and receive electronic mail. (modems) \$199.



## HandOff

HandOff lets you open any document from the finder, even if its application is missing. You can specify a compatible substitute based on the document's creator or file-name extension, even across networks. Jean-Louis Gasse calls it "a nice, unobtrusive and very much needed extension to my Macintosh". (utilities) \$35.



## Cordless Mouse

Cordless Mouse by Mobius uses the latest Infra-Red signal transmission technology to give you more freedom and smoother movements when performing mouse functions. Features a 8-bit, 12 MHz CMOS CPU, 200 dpi high resolution, 600mm/sec. tracking speed, and low-friction Teflon footpads. ADB adapter included. (input) \$99.

## General Computing Company

WriteMove Ink Jet Printer	585.
Magnavox Color Monitor 14"	599.
Microlytics DataStor-8000 Personal Organizer	65.
Microtek Microtek MSF-300GS Scanner	1589.
Mobius Multiscreen Video Card w/Princeton 15" monitor	529.
Qume Crystal Print Publisher	3445.
Seikosha America Seikosha Printer (dot-matrix)	235.
Sharp The Wizard	249.
ThunderWare LightningScan	369.
ThunderScan 5.0	187.

## WingZ 1.1 (Informix Software)

With WingZ, the largest, fastest and most versatile spreadsheet for any microcomputer-you can combine numbers, words and graphs on a single page. Ver. 1.1 of WingZ has completely new documentation including a 525-page HyperScript volume, new features, enhanced 3-D graphs, expanded capabilities in WingZ HyperScript development language and much more. (business) \$269.

## HYPERWARE

Activision Focal Point II	117.
Reports for HyperCard	69.
Bantam Complete HyperCard Handbook	22.
Beacon Technologies HyperBible International Version	175.
HyperBible King James Version	145.
BrainPower ArchiText	199.
Bright Star Technology HyperAnimator 1.5.1	99.
interFACE	250.
DataDesk International HyperDialer	29.
ICOM Simulations HyperTMON	59.
MicroMaps HyperAtlas	59.
Power Up HyperTutor	29.
Silicon Beach SuperCard	125.
Softstream International HyperHit	125.
Springboard Family Matters	28.
Symmetry HyperDA 1.2	49.
TimeWorks HyperWorks Organizer	57.

## INPUT/OUTPUT

Altra Felix	127.
Cutting Edge CE-105 ADB Keyboard	125.

## Payroll PLUS (Aatrix Software)

Payroll PLUS handles any number of employees (limited only by disk space), plus special accounting for restaurant employees, contractors, and commissioned sales people. It can manage the payroll from up to ten different income sources or rates. Payroll Plus prints form 1099 and itemizes and accumulates straight time, overtime, double time, vacation, holiday and sick pay. It can also calculate prorated sick and holiday pay based on hours worked. (finance) \$149.



## DataDesk Intl.

Mac 101 Keyboards	139.
International versions	Call
Kensington New Turbo Mouse	109.
Koala MacVision 2.0	219.
Kraft ADB Joystick Premium III (SE&II)	49.
QuickStick	39.
Kurta IS/ADB Tablet 8 1/2 x 11	255.
Mobius Cordless Mouse	99.
Mouse Systems A+ Mouse (SE/II)	79.
A+ Mouse (512/Plus)	63.
Practical Solutions The Cordless Mouse	99.
Mouse Master	39.
Summagraphics Bit Pad Plus	325.



## LANGUAGES

Digital, Inc. Smalltalk/V MAC	129.
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Shana Corporation Inside Out	369.
SmethersBarnes Prototyper	189.
Symantec THINK'S C 4.0	159.
THINK'S Lightspeed Pascal	105.
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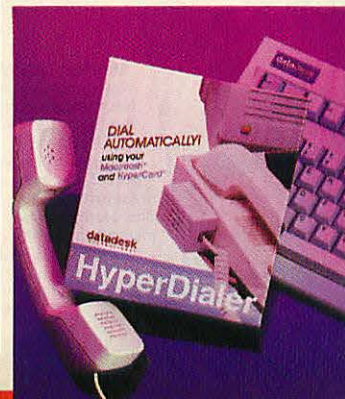
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InterFax 24/96	429.
Best Data Products SmartOne 2400/1200	145.
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Bogas Productions Super Studio Session 2.0	65.
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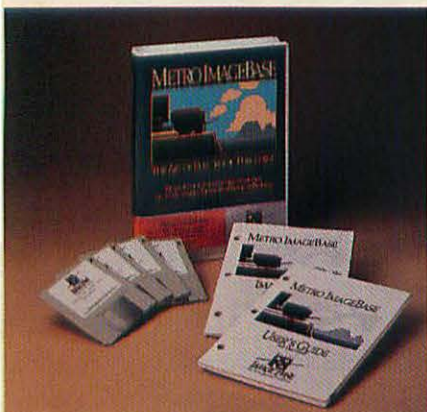




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### HJC Software, Inc.

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BookEnds	53.
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POWERIcons or POWERmenus ea. ....	39.
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<b>Microlytics</b>	
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ClipShare .....	139.
MultiClip .....	50.

## Williams & Macias

DiskFinder .....	27.
myDiskLabeler .....	33.
StickyBusiness 1.07 .....	89.

## WORD PROCESSORS AND OUTLINERS

<b>Claris</b>	
MacWrite II .....	185.
<b>Microsoft</b>	
Word 4.0 .....	249.
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<b>T/Maker</b>	
WriteNow 2.0 .....	119.
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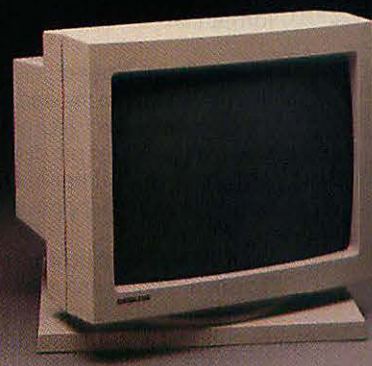
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# ART BEAT

by Deborah Branscum

*This column examines the tools and talent behind Macworld's graphics*

**Effect:** The subtle graduated color fill that we use behind Best-Sellers on the back page of every issue and the more obvious color background of Service Hero (a sidebar in *Conspicuous Consumer*) on page 82 move smoothly from one shade or color to the next, but graduated fills done badly can create obvious banding problems, as shown here.

**Tools:** Any Mac and graphics or presentation program that allows you to create graduated fills.

**Technique:** Banding is the way a printer simulates a continuous change in tone. For example, you might want to create a graduated fill that goes from black to white from the top to the bottom of a vertical page, which you print out on a LaserWriter. There is no way to avoid visible banding completely, but you can control it, according to senior design associate Arne Hurty. Two important factors are the lines per inch (lpi) and dots per inch (dpi) of your output device. Lpi measures the size of the digital halftone dots. Dpi refers to the small resolution dots that make up the

This is a gradation  
using a 120 lpi screen at  
2400 dpi output resolution.

This is a gradation  
using a 150 lpi screen at  
1200 dpi output resolution.

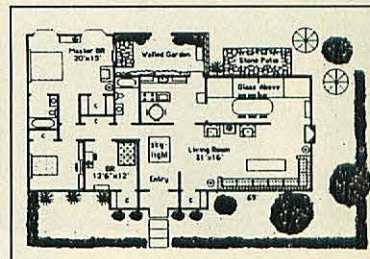
digital halftone dots.

"There's a simple formula that takes into consideration the relationship between halftone dots and resolution dots and tells you how many shades of gray to expect in your output," says Hurty. The first thing you need to know is the dpi resolution of your output device. Resolution varies depending on the device. (A Linotronic, for example, can have output resolutions of 635, 1270, or 2540 dpi. A LaserWriter's output resolution is 300 dpi.) Next you need to know the lpi of your device. (The default for a LaserWriter is 53 lpi.) Now divide the dpi by the lpi ( $300 \div 53 = 5.66$ ), then square the result, says Hurty (that's  $5.66 \times 5.66 = 32$ ). Now add 1 ( $32 + 1 = 33$ ).

"Now that you know the  
(continues)

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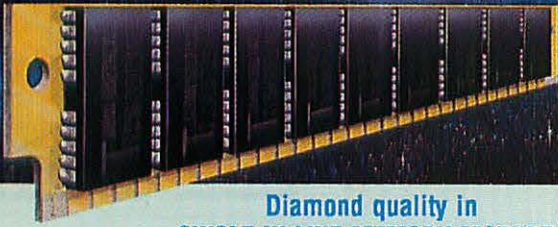
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number of grays [33]," says Hurty, "it is time to figure out the distance your gradation will cover." A standard vertical page is 11 inches long. Our example covers a gradation over the entire page. If the total number of grays is 33 and you are using all of them (black to white), you should divide the total number of grays by the distance covered ( $33 \div 11 = 3$ ). The answer is the number of bands of gray per inch in your gradation, and in this case the different bands of gray will be very distinct. But they don't have to be.

"Many programs will let you change the lines per inch for the entire page or for specific elements," says Hurty. The designer suggests

that you try experimenting with a coarser screen or with fewer lpi to control banding. If you set your program to use 28 lpi, for example, you will end up with 10.5 bands per inch, making a smoother color gradation across the page. If you don't have control over the lines per inch, reduce the distance of your gradation, if possible.

For Service Hero, there are 450 shades of color across about 2.5 inches, moving from a mix of blue (100 percent cyan and 50 percent yellow) at one corner and yellow (100 percent) at the opposite corner to 0 percent color in the center. Hurty used settings of 120 lpi and 2540 dpi for the Linotronic output. **M**

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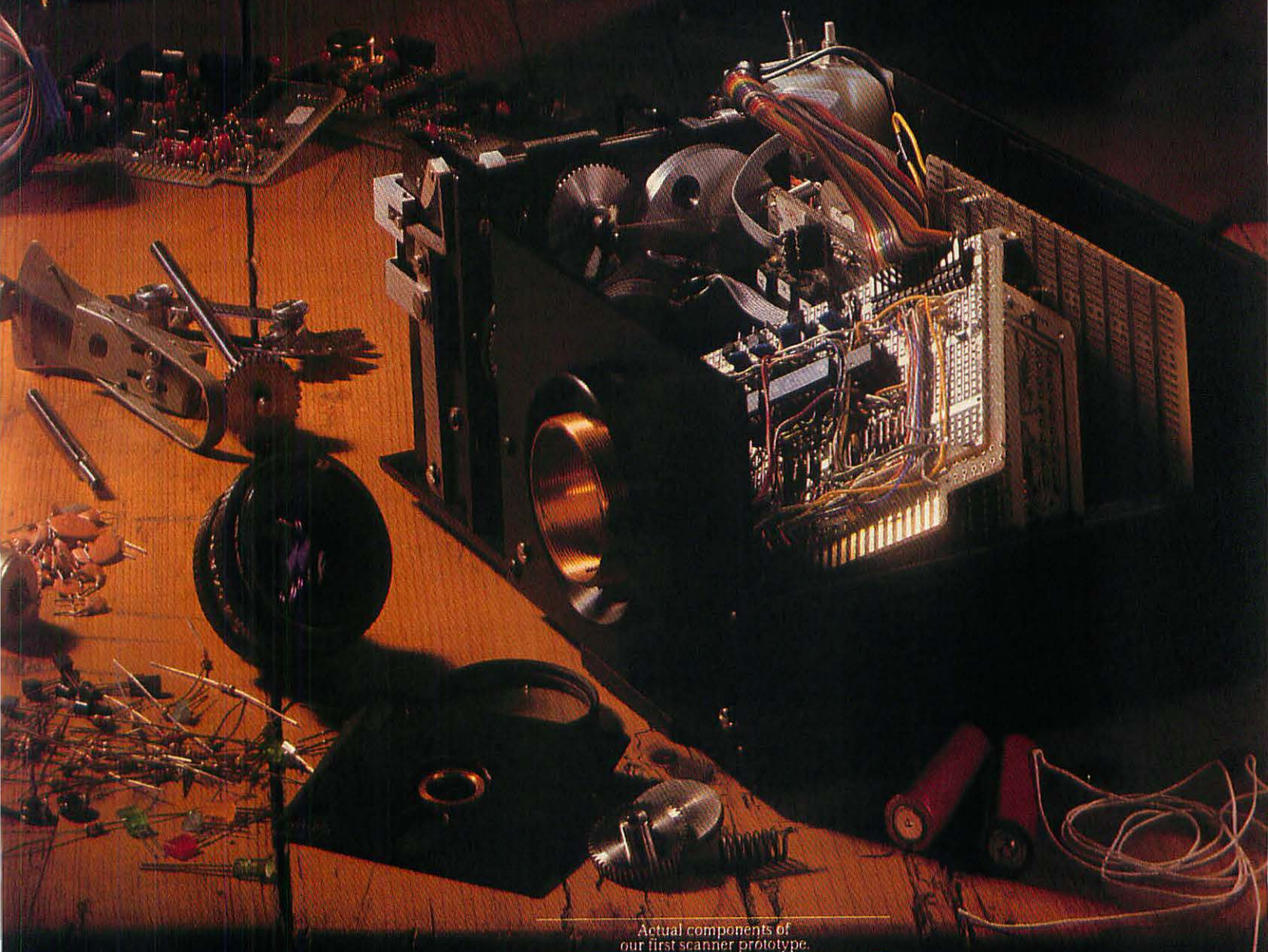
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XEROX

# After having invented the scanner...

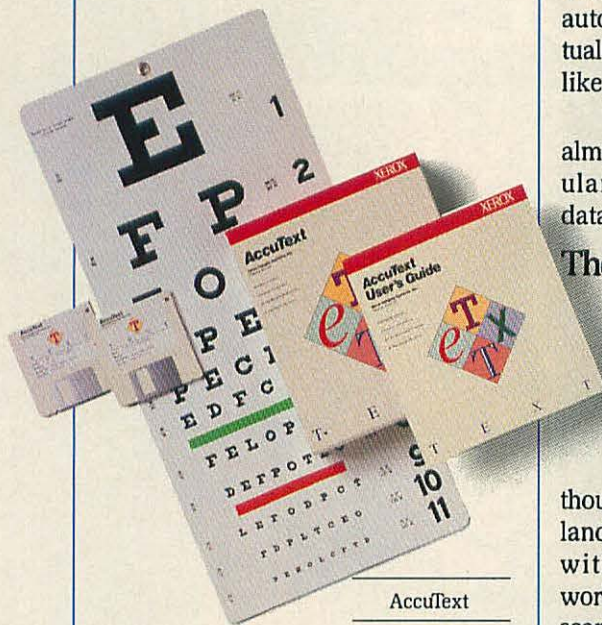


Actual components of  
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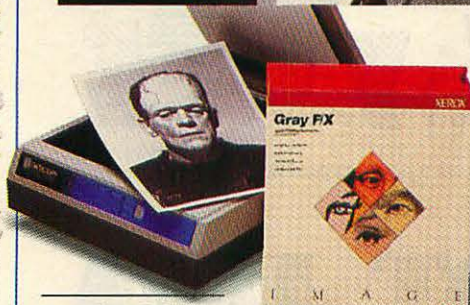
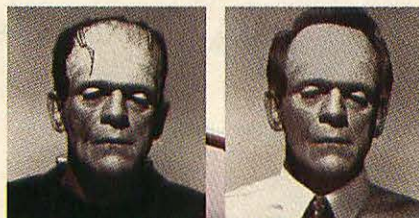
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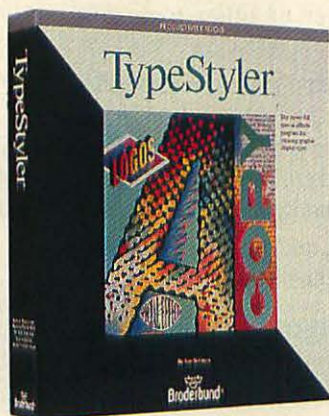
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# Honey, I Split the Keyboard

Is this a crackpot  
invention or a true  
design breakthrough?

by Steven Levy

**B**efore Tony Hodges will show you his keyboard, you must first submit to a modest test. This form of torture is supposedly instructive in the anatomy of the hand. The exercise consists of holding your hands away from your body at an unnatural angle and shaking the wrists and fingers steadily, as if emulating a pianist undergoing a seizure. It soon begins to hurt and you want to stop.

But Tony, a slim and hyper fellow of 49 who is sort of a cross between Paul Hogan and Professor Irwin Corey, won't let you. "Keep going!" he barks, barely pausing in his nonstop monologue, which includes gruesomely detailed descriptions of disorders ranging from carpal tunnel syndrome to De Quervain's stenosing tenosynovitis, scathing denunciations of the foreign trade balance, and righteously indignant appeals on behalf of overworked and abused female clerical workers.

You don't quite know which is worse, the increasing pain in your wrists and fingers ("Keep shaking! Don't stop!") or Hodges's relentless soliloquy, a tsunami of consciousness that threatens to swamp you in verbiage. But soon you know without a doubt which is worse: the pain in your left hand, which is beginning to involuntarily curl into a Boris Karloff clench. "I can't go

on, it hurts too much," you announce, and Tony Hodges nods with satisfaction. He casually informs you that your hands are already shot from using standard com-

puter keyboards. You are another casualty. If unchecked, this problem will soon lead to digital impotency. You are yet another potential beneficiary of Tony Hodges's marvelous invention, the Tony keyboard.



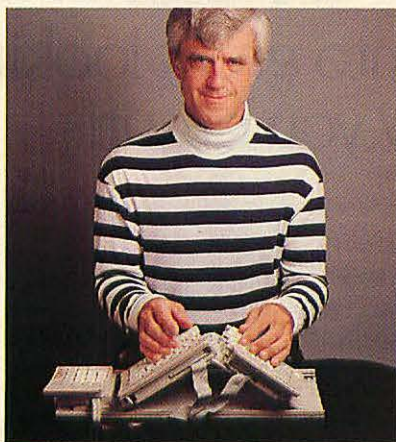
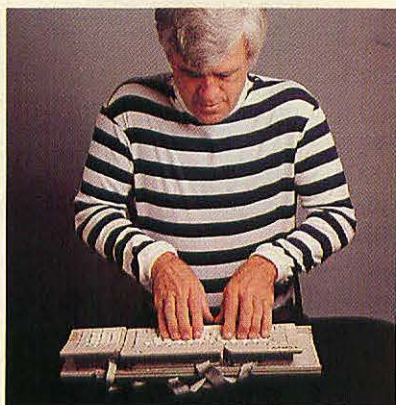
## READY TO TRY IT

Looking at it now, the prototype of the Tony (named after guess who) seems an ordinary Mac keyboard, albeit one placed on a metal base. Tony Hodges refers to all previous keyboards as *slab* keyboards, and he is not subtle in reminding you of the mortuary connotations of that term. Another of his favorite similes compares keyboards to footwear. When one visits a shoe store, he or she expects the product to be fitted. But with keyboards, Tony explains with some outrage, you are given not the shoe, but the box. One size fits none! He demonstrates this as you type with the Tony in its deadly slab position—the same as your Mac keyboard at home. Look at how your shoulders are hunched over. Notice the painfully twisted position your wrists must assume. No wonder keyboardists are coming down with muscle disorders in plague proportions.

## TYPING WITH TONY

Only now does Tony Hodges let you make use of the Tony's protean abilities. He shows you how the keyboard breaks in two, creating a fissure to the right of the 5 key, the T key, the G key, and the B key. It then hinges into an inverted V shape. You type on it to the accompaniment of Hodges's assurances that your arms are no longer forced to awkwardly angle toward your body. You are mildly surprised that it doesn't take much time to get used to this odd angle.

Then Hodges tells you to go all the way—to raise the middle of the keyboard off the desk, as if something underneath the Tony's center had risen up. The angle on each side of the keyboard is adjustable, and the idea is to slip each half of the  
(continues)

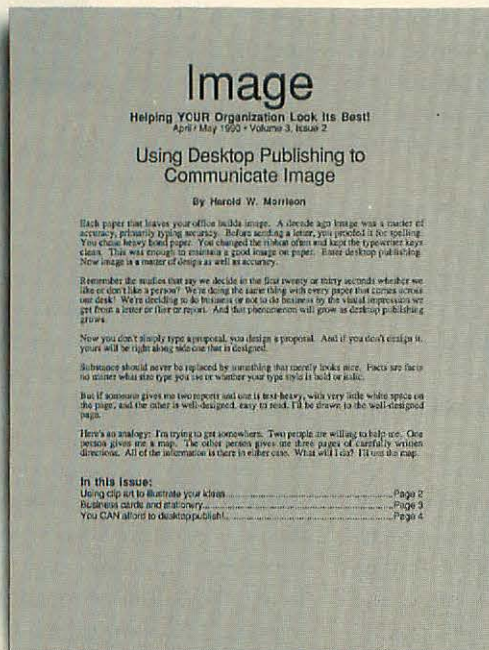


*The Tony keyboard can be adjusted on a flat plane or be raised, rotating the hands and wrists for more comfortable typing.*



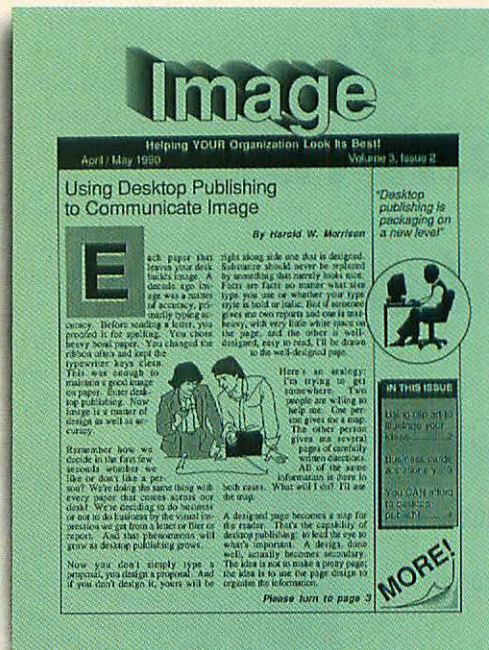
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board alongside the corresponding hand. So instead of typing with each hand curled over a flat slab, you are holding your mitts sideways, as if drawing a pair of six-shooters. The keys have, in effect, risen up to meet your hands in their most comfortable position. Tony Hodges exults in the correctness of this state, claiming that he has transformed the slab into a pillow, an ergonomic bull's-eye.

Boy, it looks weird. But you type on it, feeling a bit at sea. You manage to get letters on the screen. It doesn't feel bad at all, but then you remember typing something on your plain old Apple keyboard just the other night, and you weren't exactly writhing in pain. So what's the difference?

### METAMORPHOSIS

Hodges shows you the difference. He "takes you down" by reflattening the Tony and returning it to its uncracked state. "Try it now," he insists, and sure enough, you find yourself cramping your body in what suddenly seems a ridiculously twisted position. This is kind of revelatory, and now you are sure this guy is on to something. You can *feel* it. You make the mistake of commenting about this to Hodges, who snaps up the remark as emphatically as an iguana uses his tongue to snare an unsuspecting fly.

"Of course! It's—it's Kafka!" he howls. And he rails on about how millions of workers, mostly women, are suffering on traditional keyboards because the companies that employ them, run by men who don't spend hours at computer terminals, just *don't care*. Managers sniff at the problem and tell their workers to take some aspirin. What companies don't realize is that this problem is costing them a heap of money in health insurance costs and absenteeism. If only they would see the solution—the Tony keyboard. And Tony Hodges isn't in this for himself, no. He wants to do it to help these people!

And, in addition, he wants to help the country, the U.S. of A., so much that he won't allow manufacture of the Tony anywhere but right here. He's turned down big deals because of this, but Hodges wants to do it his way. His current idea is to get financing (not "vulture capital,"

since those guys want control and before you know it, they'll be making Tonys in Korea) and manufacture the boards himself. Though he's deep in the hole, Hodges thinks it's inevitable that millions will eventually be using the Tony. And he's stubborn enough to see it out.

So what are we to make of Tony Hodges and his promising invention? It seems as if it might be worthwhile to buy one. But we can't, since it isn't for sale yet. To hear Hodges talk about it, this is a class struggle. He is appalled that even such an enlightened company as Apple Computer did not immediately recognize the Tony's benefits—this, he says, after Alan Kay told Hodges he had made hardware soft, and Jean-Louis Gassée praised its genius. Here is Hodges with a terrific invention that could preserve millions of carpal tunnels, and all he has to show for it so far is a house mortgaged three times and a single battered prototype. And a dream, which he insists is on the way to realization, that out of obscurity the Tony will become standard issue. I think of the great inventors, many of them as eccentric as Hodges, and I realize that I am in the presence of something mythic: the crank tinkerer with a better mousetrap. Or so it seems. Actually, the phenomenon of the Tony is as plastic and malleable as the keyboard itself. You can use it to draw any number of lessons about the way creative people work, the way business works, or the way the world itself works.

### SLAB IN THE FACE

Certainly the Tony addresses a real problem. Hand and wrist injuries among those who bang away on computer keyboards are reaching epidemic levels. Robert Markison, the chief of hand surgery at San Francisco General Hospital, estimates that we spend between \$20 billion and \$30 billion annually treating hand and upper extremity injuries. (Who can place a cost on the human pain and the productivity loss from this?) Markison sees this as a result of overuse—he notes that during a 25-year career, a typist's fingers will travel 62,000 miles, more than twice the Earth's circumference. In a day, figure ten miles, traveling by finger. That's a lot of "Itsy" (continues)

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Bitsy Spider" games, and what makes it worse is the conventional keyboard. The slab, says Markison, causes problems in the trapezius, levator scapulae, rhomboid, deltoid, bicep, humerus, flexor carpi ulnaris, pronator, flexor tendons, ulnar nerve, and median nerve. The result can be all sorts of headaches and strain problems and sometimes even near-paralysis in the hands.

So why hasn't anyone before Tony Hodges worked on the problem? Hodges says that the powerful people don't care because the people with the injuries are low-level employees, mostly women. He told me that during his campaign to recruit Apple Computer to his crusade, he showed the keyboard to secretaries (sorry, "area associates") who went wild at the comfort it provided—but it seems their bosses weren't interested in what they thought. Hodges says that after trying to sell Apple on the idea for months, officials finally did show interest—but only if he'd let Apple manufacture the product overseas. Which Tony Hodges had told them all along was out of the question. But don't blame Apple, says Hodges—it's the same all over corporate America.

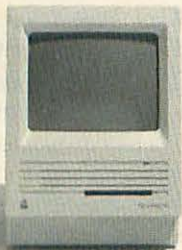
Comments from Apple Computer speak for themselves: "Yes, we have seen the Tony keyboard, and yes it's a great product," says an Apple spokesperson. "But products like this, for specialty uses and niche markets, are best left to third-party developers. We're in the business of making products for the mainstream."

Still, Hodges believes that the very efficacy of his invention will force the big boys to consider the Tony as something that might appeal to that mainstream, on the premise that people who don't want to be crippled are more than a "niche." He presents an attractive scenario wherein big business gets caught in a pincer. From below, worker bees demand the ergonomically crafted Tony, and from above, accountants and insurance execs confirm its value. Soon the world will be Tony-ized, and injuries from keyboard overuse—what amounts to the equivalent of the asbestos crisis, says Hodges—are averted. This eccentric, stubborn backyard inventor, a guy whose past includes

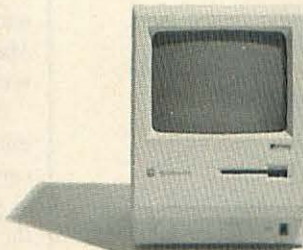
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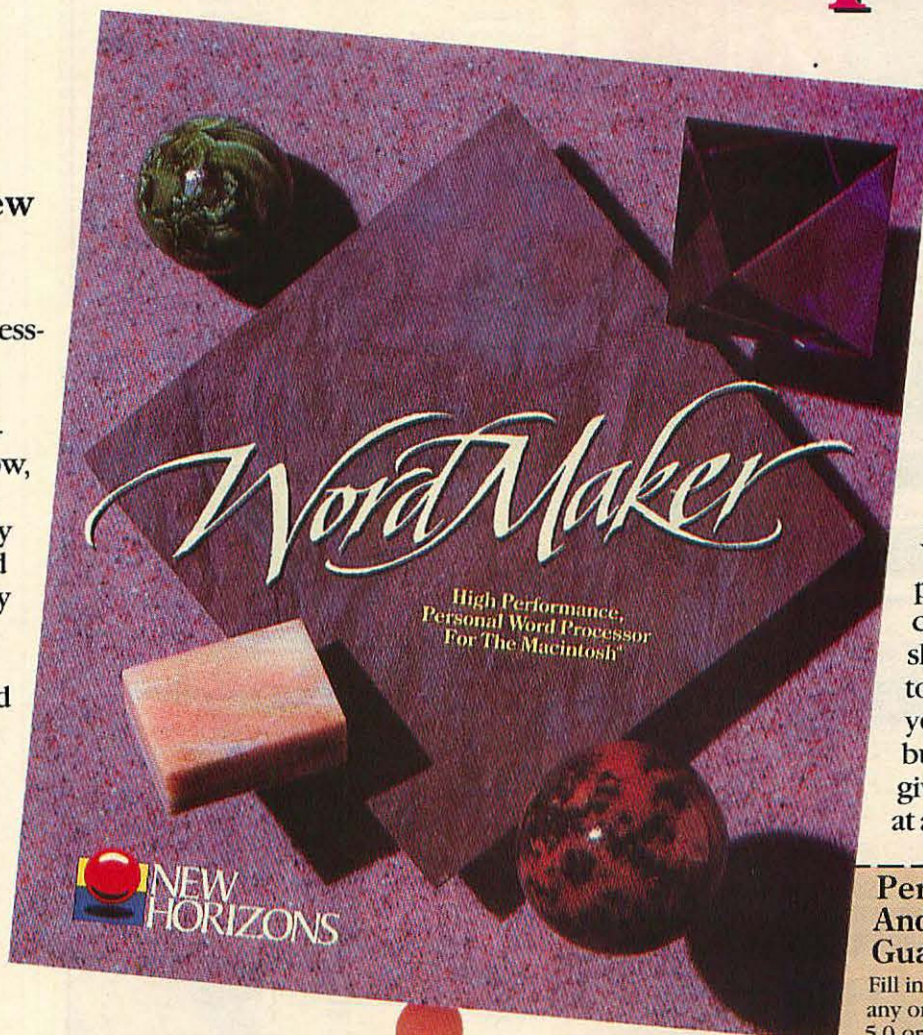
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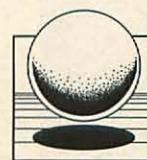
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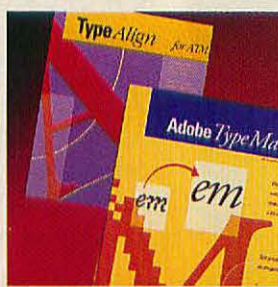


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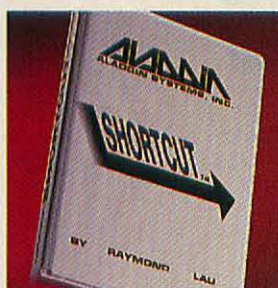
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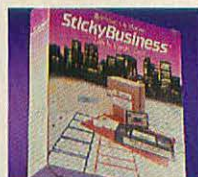


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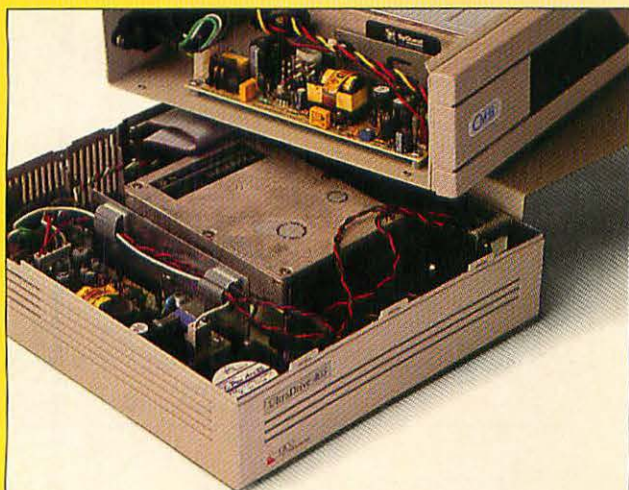
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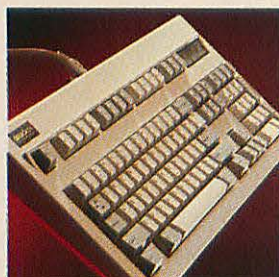


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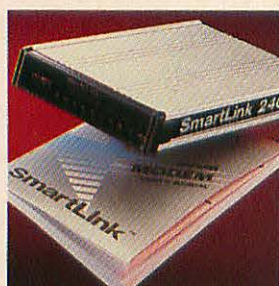
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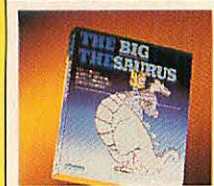
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## Foundation Publications

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## Fox Software

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## Generic Software

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## High Performance Systems

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## Micro Planning Software

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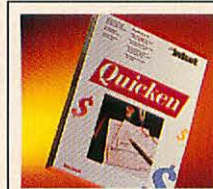
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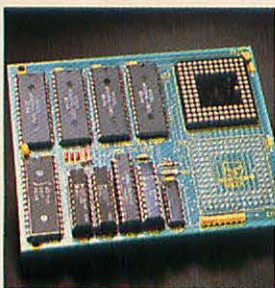
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<b>Survivor Software</b>	
Invoice It	52.
MacMoney 3.02	59.
<b>Symantec</b>	
Just Enough Pascal	49.
Lightspeed Pascal 2.0	92.
More II	249.
S.A.M.	65.
S.U.M. II	94.
Think C 4.0	165.



**White Knight 11.0** ..... **\$89.**

**FreeSoft**  
(Formerly Red Ryder) now an even better solution to your telecommunications needs: send in the White Knight. Also includes Okyto 1.0.

<b>Symmetry</b>	
Acta Advantage	64.
HyperDA 1.2	49.
Key Plan	245.
Picture Base & PB Retriever	54.
<b>Synergy Software</b>	
KaleidaGraph 2.0	145.
Versa Term 4.0	88.
Versa Term Pro 2.20	174.

<b>Synex</b>	
MacEnvelope Plus	179.
<b>T/Maker</b>	
Click Art Business Images	29.
EPS Illustrations	74.
WriteNow 2.0	CALL

<b>Tactic Software</b>	
ArtClip 1st Ed	49.
ArtClip 2nd Ed	68.
ArtFonts 1/2/3	52.
ArtFonts Pack	129.
Fontshare	129.
Icon-It	42.
Sound Clips 1 or 2	each 50.

<b>TGS Systems</b>	
ProGraph	126.

<b>Timeworks</b>	
HyperWorks Organizer	59.
Publish It!	238.

<b>TML Systems</b>	
TML Pascal II 3.0	56.
...with MPW 3.0	108.
TML Source Code Library	39.

<b>TOPS</b>	
InBox 3.0	CALL
TOPS (DOS Version)	99.
TOPS (Mac Version)	139.
TOPS NetPrint 2.0	117.

<b>Totem Graphics</b>	
EPS Color Clip Art (by Subject)	
Birds	98.
Domestic Animals	98.
Fish	98.

Flowers	98.
Food	98.
Holidays	98.
Insects	98.
Nautical	98.
Sports	98.
Tools & Hardware	98.
Wild Animals	98.
Women	98.

<b>EPS Color Clip Art (by Vol.)</b>	
Volume 1 - 12	each 74.

<b>Traveling Software</b>	
Lap-Link Mac 2.0	81.

<b>Trendware</b>	
XCAL	77.

<b>True Basic</b>	
3-D Graphics	43.
Business Graphics	45.
Scientific Graphics	43.
True Basic 2.02	56.

<b>U.S. Micro Labs</b>	
FontSizer	69.

<b>VersaCad</b>	
VersaCad Drafter	419.

<b>WordPerfect Corp.</b>	
WordPerfect 1.02	189.

<b>Xerox (Datacopy)</b>	
AccuText	545.

<b>Zedcor Inc</b>	
DeskPaint/DeskDraw	64.
ZBasic 5.0	89.

## HARDWARE

### ACCELERATORS & UPGRADES

<b>Daystar Digital</b>	
Fast Cache - Mac IIci	756.
<b>Mac II or Ix Accelerators</b>	
25MHz	1798.
33MHz	3098.
40MHz	3748.
50MHz	4498.



**800k Floppy Drive** ... **\$149.**

**Fujitsu**  
This new 3.5-inch disk drive can help you enjoy a lot more of a good thing.

Namely your Macintosh.

<b>Dove</b>	
SCSI Port Adapter	109.
<b>MacSnap Upgrades</b>	
524 (512k to 1 Mb)	192.
524e (512K to 1 Mb)	185.
524s (524e w/SCSI)	235.
548 (512k to 2 Mb)	432.
548e (512K to 2 Mb)	415.
548s (548e w/SCSI)	475.

<b>Marathon 020 SE Accelerators</b>	
MSE1 (68020 Board)	419.
MSE2 (...w/1 Mb)	715.
MSE3 (...w/68881 chip)	598.
MSE4 (68020 Accelerator w/68881 & 1 Mb)	895.

<b>Marathon 030 Accelerators</b>	
32MHz - Mac II	965.
32MHz - Mac Ix	975.
32MHz - SE/30	995.

<b>Irwin</b>	
Excelsator XI 20 MHz	CALL
Excelsator XI 25 MHz	CALL

<b>Macintosh</b>	
One Mb SIMMs	CALL
256k SIMM Module	CALL

<b>Motorola</b>	
<b>Math Co-Processors</b>	
68882 - 16MHz	289.
68882 - 25MHz	399.
68882 - 33MHz	695.
68882 - 40MHz	748.
<b>Orchid Technology</b>	
Mac Sprint II	249.



**Bulk Mailer** ..... **\$77.**

**Bulk Mailer Plus** ..... **\$189.**

**Satori Software**  
Vers. 3.2.3 Powerful mail list mgmt. Duplication elimination, Zip & alpha sorts, etc.

<b>Total Systems</b>	
<b>Gemini 020/030 Accelerators</b>	
68020 SE - 16MHz	697.
68020 SE - 25MHz	1118.
68030 SE - 16MHz	976.
68030 SE - 20MHz	1118.
68030 SE - 25MHz	1118.
Gemkit	149.

### TAPE BACKUPS & REMOVABLES

<b>Everex - EMAC Drives</b>	
60 Mb Tape Backup	658.
150 Mb Tape Backup	1199.
EMAC 60/60dit Deluxe	1495.

<b>PCPC</b>	
Jetstream	4725.

<b>PLI (Peripheral Land, Inc.)</b>	
Infinity 40 Turbo	998.
Infinity 40/40 Turbo	CALL
Infinity Removable Optical Disk Drive 600 Mb	3998.
TurboFloppy 1.4	345.

<b>NEC</b>	
Intersect Cdr-35 Portable CD ROM Drive	495.

<b>Syquest</b>	
44 Mb Cartridges	89.

### MONITORS & CARDS

<b>Micron - Color Video Cards</b>	
<b>Xceed Color Cards</b>	
10-78 - 8 Bit Mac II	598.
6-48 - 8 Bit Mac II	385.

<b>NEC Monitors</b>	
MacSync 14" Color	555.
MultiSync XI 20" Color	2695.

<b>RasterOps</b>	
ClearVue/SE 19" Monitor & 16MHz Board	1595.

<b>ColorBoards</b>	
108+ for Mac II Series	CALL
108+ for Mac SE/30	CALL
224 (32 Bit Color)	3995.
264 for Mac II Series	785.
264 for Mac SE/30	1038.
Trinitron 19" Monitor	3398.
TrueCapture 324	1995.

<b>Sony Color Monitors</b>	
14" 1304 HG Multiscan	795.
16" HG Multiscan	2498.
19" HG Multiscan	3198.

### SCANNERS

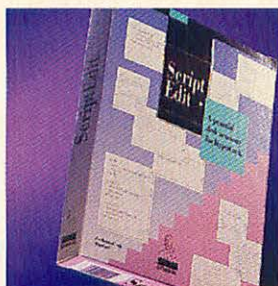
<b>Abaton</b>	
Scanner 300/GS (8 Bit)	1495.
Scanner 300/S (4 Bit)	1198.

<b>Logitech</b>	
Scan Man	320.

<b>Thunderware</b>	
Lightning Scan	368.
ThunderScan 5.0	179.

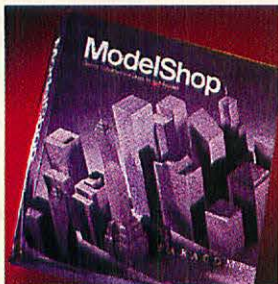
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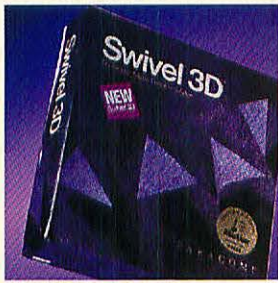
**Script Edit .....\$49.**

**Somak Software, Inc.**  
A powerful desk accessory for HyperCard®. Edit multiple scripts simultaneously, global search and replace, custom editing with XCMD, script compare feature and much more. Includes installation/tips stack, 24 page manual and reference card.



**Model Shop .....\$378.**

**Paracomp**  
Exceptional desktop design & architecture modeler for architects, city planners, construction professionals, interior, set & exhibit designers. Construct 2D/3D designs with remarkable speed, transparent interface & large database capabilities. Speeds Claris Cad, VersaCAD, AutoCAD use.



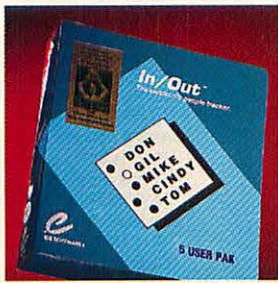
**Swivel 3D™ .....\$294.**

**Paracomp**  
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**Super Paint .....\$124.**

**Silicon Beach**  
Award winning Super Paint combines Paint and Draw in one easy to use power graphics program. Includes features like AutoTrace™ to automatically convert Paint graphics into Draw objects, a customizable Airbrush, and a Freehand tool to easily sketch editable Bezier curves.



**In/Out ... (5 Users) \$128/(10 Users) \$188.**

**CE Software**  
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**Xerox (Datacopy)**  
Datacopy 730GS ..... 798.

#### MODEMS & NETWORK

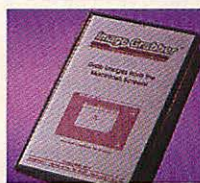
##### HARDWARE

##### Abaton

InterFax Fax/Modems  
1200 Fax/4800 Modem ..... 259.  
2400 Fax/9600 Modem ..... 418.

##### David Systems

Please call for prices and information on Twisted Pair Ethernet Equipment.



**Image Grabber 2.0 ....\$31.**

**Sebastian Software**  
"Grabs" images by lifting a copy of the bit map off the screen & easily copies these images from one program to another.

##### Dove

FastNet AE ..... 1249.  
FastNet FI-1 Ethernet LAN  
68020 Accelerator SE ..... 895.  
FastNet II Intelligent  
Controller ..... 545.  
FastNet III ..... 365.  
FastNet SCSI CheaperNet ..... 748.  
FastNet SCSI Thickwire  
Ethernet ..... 849.  
FastNet SE ..... 365.  
FastNet SE/30 ..... 369.

##### Everex

EMAC Md-2400 Baud ..... 198.

##### Farallon PhoneNet Equipment

PhoneNet - DB-9 ..... 29.  
PhoneNet - DIN-8 ..... 32.  
DIN-8 (10 Pack) ..... 198.  
Star Connector ..... 19.  
Star Connector (10 Pack) ..... 198.  
Remote Wakeup Modem  
Cable ..... 31.  
Repeater ..... 315.  
Star Controller ..... 890.

##### Hayes

InterBridge ..... 648.  
Smartmodem 2400 ..... 385.  
Smartmodem 9600 ..... 899.

##### Incomm Modems

Midget 2400 ME ..... 198.  
Midget 4800 E ..... 225.  
Turbo 9600 Baud V.32 ..... 635.  
Mac II Internal Modems  
Midget 2400 Baud ..... 169.  
Turbo Mac 9600 Baud ..... 845.

##### Kinetics

EtherPort II ..... 469.  
EtherPort II L ..... 498.

EtherPort SE ..... 469.  
EtherPort SE L ..... 498.  
EtherPort SE/30 ..... 469.  
EtherPort SE/30 L ..... 498.  
Fast Path ..... 1945.

##### MacTech

SmartLink 2400M ..... 245.  
SmartLink 2400S ..... 139.  
ZoneNet Cable Kit DB-9 ..... 17.  
ZoneNet Cable Kit DIN-8 ..... 17.

##### Nuvotech

Turbo Bridge ..... 345.  
Turbo Net - DB-9 ..... 22.  
Turbo Net - DIN-8 ..... 21.  
Turbo Net ST - DB-9 ..... 30.  
Turbo Net ST - DIN-8 ..... 30.

##### Orchid Technology

MacFax Modem (9600) ..... 446.

##### Shiva Corporation

Ethergate ..... 1831.  
NetBridge ..... 339.  
NetModem V2400 ..... 439.  
NetSerial ..... 279.  
TeleBridge ..... 348.

##### Supra Corp.

Supra Modem 2400 ..... 119.

##### Telebit Modems

T-1000 9600 BPS ..... 699.  
T-2500 V.32 19,000 ..... 1254.

##### TOPS

Flash Card (TOPS Dos) ..... 158.  
TOPS FlashBox ..... 109.  
TOPS Repeater ..... 128.

##### U.S. Robotics

2400 Baud Modem ..... 325.  
9600 HST Baud Modem ..... 685.



**PSN .....\$119.**

##### IPT

Personal Server Network: a distributed networking solution providing AppleShare services without the need for a dedicated Macintosh.

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##### AAPPS Corporation

Micro TV ..... 269.

##### Abaton

Quickstep Page Printer ..... 3295.

##### Dayna Communications

Dayna Talk Connector ..... 99.

##### DaynaFile - Single Drives

DaynaFile ..... 525.  
Df0100 (360k) ..... 605.  
Df0200 (1.2 Mb) ..... 605.  
Df0300 (720k) ..... 605.  
Df0400 (1.44 Mb) ..... 685.



**DiskTop 4.0 .....\$65.**

##### CE Software

This DA performs all of the most useful functions of the Finder, and then some. Comes complete with GÖlter, LaserStatus and Widgets.

##### DaynaFile - Dual Drives

Df0102 (360k/1.2 Mb) ..... 729.  
Df0103 (360k/720k) ..... 729.  
Df0104 (360k/1.44 Mb) ..... 755.  
Df0204 (1.2/1.44 Mb) ..... 898.

##### Orange Micro

Grappler 9 Pin (C/Mac/GS) .. 78.  
Grappler Mac LQ ..... 102.  
Grappler Mac LS ..... 102.  
Grappler Mac LX ..... 137.  
Mac 286 NuBus Card ..... 1099.  
Mac 86 NuBus Card ..... 498.

##### Qume

Crystal Print Publisher ..... 2950.

## ENTERTAINMENT

##### Access Software

World Class Leader Board ... 25.

##### Accolade

4th & Inches ..... 27.  
FastBreak ..... 27.  
Grand Prix Circuit ..... 27.  
Hardball ..... 26.  
Mean 18 ..... 26.

##### Activision

Cosmic Osmo ..... 41.  
Manhole ..... 29.  
Manhole CD Version ..... 35.  
Quarterstaff ..... 29.  
Shanghai ..... 19.

##### Addison Wesley

The Hobbit ..... 26.  
Fellowship of The Ring ..... 26.  
The Shadows of Mordor ..... 26.  
The Crack of Doom ..... 26.

##### Brøderbund

Ancient Art of War ..... 26.  
Ancient Art of War at Sea ..... 26.  
PlayMaker Football ..... 32.  
Shufflepuck Cafe ..... 23.  
SimCity 1.1 ..... 27.  
SimCity Color ..... 49.  
Star Wars ..... 26.  
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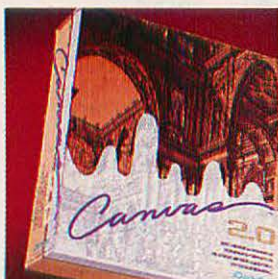
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**Canvas 2.1 ..... CALL**

**Deneba Software**  
The popular precision 24-bit color drawing program (FIVE mouse rating) just got even better, with enhanced Bezier curves, editable dashed lines, built-in 100,000 word spell checker, improved alignment, direct import of MacDraw II files, EPS export & advanced four-color process separation utility.



**TaskMaker .....\$28.**

**XOR Corporation**  
The world has plunged into depression and devastation...the once mighty Kingdom is no longer. You must restore order and prosperity to the Kingdom, but you have no experience. To gain help, find the TaskMaker, and with his guidance and your courage, the Kingdom might be saved!



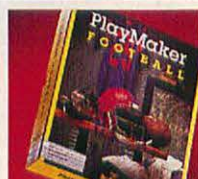
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P-51 Mustang Flight Simulator .....	31.
<b>Casady &amp; Greene</b>	
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...w/Critter Editor .....	40.
<b>Centron</b>	
Casino Master B & W .....	44.
Casino Master Color .....	49.
<b>Data East</b>	
Super HangOn .....	26.
<b>Discovery Software</b>	
Arkanoid .....	26.



**PlayMaker Football ...\$32.**  
**Brøderbund**  
Pick your squad, design plays on the chalkboard, call them in a game situation vs. friends or the Mac. Excellent animated play action.

<b>Electronic Arts</b>	
Bard's Tale .....	31.
ChessMaster 2100 .....	32.
Chuck Yeager's Advanced Flight Trainer .....	31.
Might & Magic .....	35.
Might & Magic II .....	38.
Panzer Battles .....	28.
Patton Vs Rommel .....	14.

<b>Inline Design</b>	
Bomber .....	25.

<b>Lucasfilm</b>	
Pipe Dream .....	28.

<b>Micro League Sports</b>	
Micro League Baseball II .....	35.

<b>MicroProse</b>	
Pirates! .....	32.

<b>Microsoft</b>	
Flight Simulator 1.02 .....	32.

<b>Miles Computing</b>	
Fool's Errand .....	31.
Harrier Strike Mission II .....	31.
Puzzle Gallery .....	26.

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Aussie Joker Poker .....	19.
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Colony .....	29.
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Deja Vu .....	29.
Deja Vu II .....	29.
Gauntlet .....	29.
Shadowgate .....	29.
Trust & Betrayal .....	29.
Uninvited .....	29.

<b>Origin Systems</b>	
Autoduel .....	23.
Moebius .....	23.
Ogre .....	16.
Space Rogue .....	30.

<b>Premier Software</b>	
NetTrek .....	34.
Strategic Conquest 2.0 .....	34.

<b>Shodan</b>	
Leprechaun .....	29.

<b>Silicon Beach Software</b>	
Apache Strike .....	24.
Beyond Dark Castle .....	24.
Dark Castle .....	22.

<b>Sir Tech</b>	
Wizardry .....	35.

<b>Software Toolworks</b>	
Cribbage King/Gin King .....	38.
Hunt For Red October .....	31.
Life And Death .....	31.
<b>Sphere</b>	
Falcon 2.0 .....	30.
Gato 1.4 .....	26.
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Solitaire Royale .....	19.
Solitaire Royale (Color) .....	19.
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Tetris (Color) .....	22.

<b>Spinnaker</b>	
Sargon IV .....	26.

<b>Strategic Simulations, Inc.</b>	
Ad&D: Pool Of Radiance .....	32.

<b>Strategic Studies Group</b>	
Halls Of Montezuma .....	30.

<b>Three Sixty</b>	
Sands Of Fire .....	34.
Warlock .....	28.

<b>Toyogo, Inc.</b>	
Nemesis Go Master .....	47.
Nemesis Joseki Tutor .....	28.

<b>XOR Corporation</b>	
Lunar Rescue .....	33.
Mac Racquetball .....	36.
MacCourses .....	19.
MacGolf .....	32.
MacGolf Classic .....	52.
NFL Challenge .....	49.
Pro Challenge .....	28.
Road Racer .....	38.
TaskMaker .....	28.

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<b>Bible Research Systems</b>	
The Word (KJV, NIV, NKJV, RSV) .....	164.

<b>Brøderbund</b>	
Eureka: The Solver .....	138.

<b>Bright Star Technology</b>	
Alphabet Blocks .....	29.
Talking Tiles .....	25.

<b>Brøderbund</b>	
Calculus .....	58.
Geometry .....	58.
Physics .....	58.
Type! .....	18.

<b>Davidson &amp; Associates</b>	
Math Blaster .....	26.



**SimCity .....\$27.**

**SimCity Color .....\$49.**

**Brøderbund**  
Now you can ask "How am I doing?" with your very own big city simulation.

<b>Great Wave Software</b>	
KidsMath .....	26.
KidsTime .....	25.
Number Maze .....	26.

<b>Learning Company</b>	
Math Rabbit .....	31.
Reader Rabbit 2.1 .....	31.

<b>Nordic</b>	
Alphabetizer .....	27.
BodyWorks .....	27.
Clockworks .....	27.
CoinWorks .....	27.
EarthWorks .....	27.
FlashWorks .....	27.
Lemonade Stand .....	27.
Naval Battle .....	27.
Preschool Disk 1 .....	27.
Preschool Disk 2 .....	27.
Turbo Math Facts .....	27.
Word Search .....	27.

<b>Penton Overseas</b>	
VocabuLearn/ce	
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Spanish .....	Level 1 or 2 - 29.



**Preschool Pack .....\$41.**

**Nordic (MacKids)**  
6 color educational games, including: AlphaWorks, Bar Math, Concentration, Connect The Dots, Counting 1, 2, 3, & ShapeWorks.

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LP4 Creating Artwork .....	36.

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<b>PageTutor Training Series</b>	
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P3 Tips & Techniques .....	36.
P4 Advanced Features .....	36.

<b>LearnWord Training Series</b>	
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W3 Advanced Level .....	36.
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XL8 Macros for Excel 2.2 .....	36.
XL9 What's New for 2.2 .....	36.

<b>Simon &amp; Schuster</b>	
Typing Tutor IV .....	29.

<b>Software Toolworks</b>	
Mavis Beacon Typing .....	32.

<b>Spinnaker</b>	
Typing Made Easy .....	25.

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Discrete Mathematics .....	33.

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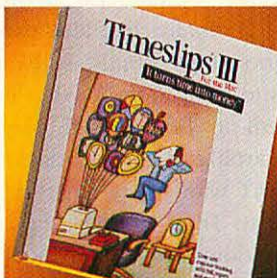
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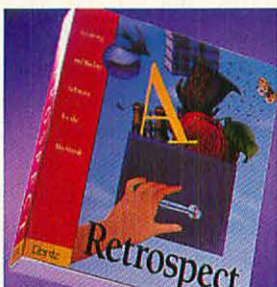
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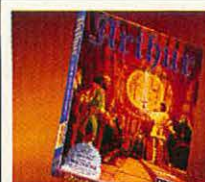
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airline piloting and city planning but not anatomical scholarship, will change the world, in the tradition of Thomas Edison and George Washington Carver.

Hey, I love that myth. And I would sure like to see it realized in this case. But there are more than a few obstacles in Tony Hodges's path. The first is his own obstinacy. You don't have to spend more than a few minutes with Hodges to realize that he is obsessed with his invention, so

driven to see it accepted that he overwhelms his listeners.

Despite the thrall of his salesmanship, some issues remain. Most glaringly, there has never been a scientific study performed to see if the Tony keyboard is any better than the slab. It is true that the aforementioned Dr. Markison tried it informally and was much impressed, and Markison now says that he is embarking on a study that will thoroughly gauge the

reactions of 50 typists using the Tony over a three-week period. I am not qualified to say whether or not three weeks is sufficient, but I do know that the problems of the conventional keyboard arise over months or years of use.

And even Dr. Markison, a Tony enthusiast (though he says he has no financial stake in Hodges's enterprise), notes that the present Tony prototype needs several improvements. The spacebar should be relocated and each key should be adjustable by height, pitch, roll, and yaw so that it fits the fingers of one's hands as snugly as a custom glove. Tony Hodges says he'll make those improved prototypes as soon as he gets financing. And he runs through a roll call of interested companies, some of whom, he says, have already signed purchase orders. But what if the testing shows that more work is needed? Or that more testing is needed? Does Tony Hodges fill his purchase orders and improve the keyboard gradually, like a software publisher who ships buggy software with promises to fix it in the next release?

I seem to find myself playing the skeptic, carping at Tony Hodges's dream. But I don't want to do that—it doesn't seem fair to Tony Hodges, the one person who's doing *something* about a problem that should be addressed on a larger scale. There should be massive funding available for a health care-related problem like this. But all we have is this frustrated eccentric carrying a beat-up prototype under his arm, banging on the door of corporate America while a nagging voice booms in his head: *You can ease their pain.*

Some things should not be left to the economics of the marketplace, and public health problems arising from computer use is one of those things. Perhaps Tony Hodges's keyboard will ease the problem, if we give it a chance. But Tony or no Tony, the lack of concern among corporations and public agencies on this problem deserves our criticism and scorn. **M**

*Steven Levy is a Macworld columnist and the author of The Unicorn's Secret: Murder in the Age of Aquarius, now available in paperback from NAL.*

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# Old Machines Find New Life

Upgrades keep classic Macs in business

by Deborah Branscum



In an era of hardware envy, classic Macs may seem outdated and quaint, artifacts suitable for museum display.

But several companies have accelerator boards, memory upgrades, and SCSI interfaces that will keep your 128K or 512K Mac out of storage and in action.

You'll be stuck in the software dark ages without an upgrade to the Mac Plus 128K ROM-chip set, which is required by most applications. (If you own a 512KE, you already have the 128K ROMs and 800K internal floppy drive.) The newer ROMs provide better QuickDraw performance than the old 64K ROMs and they allow you to run the hierarchical file sys-

tem (HFS) and to access SCSI devices such as hard disks. For true conversion to Plus performance, you'll also need 800K floppy drives, more memory, and a SCSI port.

Apple offers an upgrade package, of course, but keep in mind that third-party upgrades are more flexible because you can choose the features you want, and add them piece by piece. You can add just memory, or just a SCSI port, or both. And third-party upgrades can offer better performance than Apple's Plus upgrade.

The advantage to buying Apple's upgrade is that you'll end up with an official Mac Plus. The disadvantage is that it's becoming harder to justify the expense of an Apple upgrade (\$1098 and \$898 for 128K and 512K machines, respectively) with Mac Plus prices hovering around \$1200.

Thom Hogan says that for many reasons it's smarter to buy a new Plus than to upgrade older machines (see "Macs, They Are A-Changin'", October 1989). But if you're a stubborn or sentimental cuss who insists on upgrading, there are companies who want your business.

Oregon-based Total Systems, for example, makes the Gemini 020/30 accelerator and multifunction board for classic

Macs, Pluses, and SEs. "We felt that the original Macintosh owners were being abandoned by Apple and they were in need of help," says David Shipway, company president. "It's the philosophy of this company to try to provide new technology for older systems. So putting a 68030 accelerator into an older machine makes sense."

The Gemini accelerators range in price from \$995 to \$2995 depending on clock speed, processor, options such as floating-point unit, and Mac model (whether you have a classic Mac, Plus, or SE). The 030 version of the Gemini comes with a 16MHz, 20MHz, or 25MHz 68030 processor and includes a built-in high-speed SCSI interface. There's also a PMMU for virtual memory now (with Connectix software) or later with System 7.0. There are three advantages to upgrading, according to Shipway. First is the sentimental advantage of keeping a machine you're fond of. Second is the economic benefit of spending less for an accelerator than you would for a new system. Third is the performance boost of the board, which not only speeds up your machine, but also can run a large display and enable you to expand memory up to 4MB.

Total Systems also offers memory upgrades for older machines, standard SCSI ports, drive upgrades, and a heavy-duty power-supply upgrade, called Power-Up, for \$125. "We also sell do-it-yourself kits for people who are not faint of heart," says Shipway. The standard power-supply upgrade kit is priced at \$45. The company offers a 1-year guarantee on all its products and advertises a 30-day money-back guarantee with its boards. (You can reach Total Systems at 503/345-7395 or 800/874-2288.)

Dove Computer's first product, introduced in 1985, was a 1MB memory enhancement for the 128K Macintosh. So perhaps it's not surprising that the North Carolina company continues to cater to its first customers. Dove still makes 1MB memory upgrades for the littlest Macs (which are available only through Total Systems for \$389). In addition, the company manufactures MacSnap memory enhancements for 512K and 512KE machines. *(continues)*



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## SERVICE HERO

**S**ean Nolen of Adelaide, Australia, writes that last summer he ordered four Sun Microsystems FlashBoxes by fax from MacZone, a U.S. dealer. They arrived on time and were hooked up. "Trouble was, nothing happened! (We use a pretty decent-size 4th Dimension database.)" A stopwatch confirmed, "I would save about three minutes a day over the network." A cost-benefit analysis suggested the purchase wasn't very wise, given the small savings in time, the purchase price of a thousand-odd Aussie dollars, and the momentum of R&D in the computer field. Nolen asked MacZone for a refund for those reasons above, but didn't expect a response. In fact, MacZone assured him a credit would be forthcoming. "They went to time and expense in keeping me happy." According to Nolen, "I can honestly say I won't purchase from anyone else."

chines. The MacSnap 1MB enhancement for the 512K and 512KE retails for \$319 and \$299, respectively. The 2MB enhancement is priced at \$719 for the 512K version, and \$699 for the 512KE. A stand-alone SCSI interface lists for \$199. And a combo of 1MB of memory and a SCSI interface or 2MB of memory and a SCSI interface runs \$399 and \$799, respectively.

"They're still very good selling products for us," says E. Kyle Tyner, Dove's director of marketing. "We're going to continue to support the products out there." That support includes a 4MB RAM upgrade now under development. (Call the company at 919/763-7918 or 800/622-7627 for details.)

In 1987 John Depew started upgrading 128K and 512K Macs to pay his way through college. An undergraduate idea for making money turned into Computer Care as Depew repaired computers and designed SIMMs. Now the Minnesota-bred company is offering the \$317 Mac Rescue board for classic Mac owners. This board snaps on to your CPU and has a SCSI

port and six SIMM sockets that let you upgrade to 1MB, 2MB, 2.5MB, or 4MB of RAM, depending on your machine. Computers must have 800K floppy drives and 128K ROM chips to use the Mac Rescue board. According to Depew, the board lets businesses take advantage of underutilized assets—older Macs and 256K SIMMs. "Since memory is the only thing these computers lack, Mac Rescue will extend their lives into the nineties." The company backs the board with a limited one-year warranty. (Contact Computer Care at 612/371-0061 or 800/950-2273.)

Yet another company, Newbridge Microsystems of Ontario, Canada, is involved in the upgrade fray. The Ultramax NM 68000 MS upgrade can be had for \$395 and includes an optional video adapter for some large-screen monitors. Spectra Micro Development of Tucson, Arizona, also offers a large-screen monitor connection, as well as a 16MHz 68020, SIMM memory, and a SCSI port, on its \$995 ProBoard for classic Macs. ProBoard also requires the 128K ROMs. Check out the features tables in "Is Your Mac Obsolete?" in this issue for details on this and other products for the upgrade-minded.

(Thanks to editor Brita Meng for research assistance.)

## MORE BLASTS FROM THE PAST

Remember daisy wheel printers? If you have a hankering for true letter-quality printing and absolutely no desire whatsoever to print graphics, Quality Discount Computers wants you as a customer. The company has picked up several hundred new Qume printers that were manufactured for Apple but are no longer being produced. The Mac/Apple II-compatible device sells for \$449 with daisy wheel, ribbon, cable, and printer driver. (Sheet feeders go for \$49; tractor feeds for \$129.) Leigh Townsend, president of the company, assures me that plenty of people don't care a fig about graphics: lawyers and writers, for example.

Keep in mind that you can get a pin printer that will also do graphics for a couple of hundred more. But if you don't happen to have the extra money, or you long for that old-fashioned printed-on-a-  
(continues)



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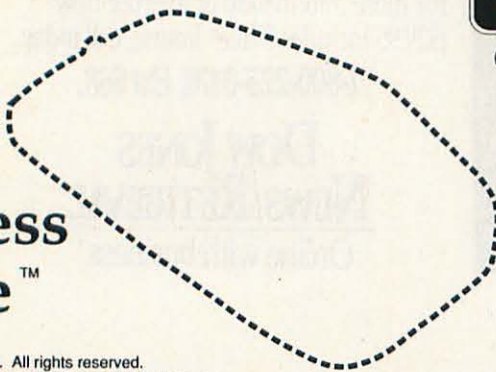
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## FEBRUARY APPLE WARRANTY WATCH



74 Months  
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typewriter look, give Mr. Townsend a call at 702/465-2473. Unfortunately, the printer has only a 30-day warranty. And be forewarned: although the printer worked just fine when I saw it, it apparently doesn't like versions of Word below 4.0 so you have to go through an extra command to print.

In other low-tech news, Utah's Sun Remarketing continues to cater to the 77,000 Lisa/Macintosh XL owners nationwide by offering a SCSI board for \$249 and a 1MB memory board (upgradable to 2MB) for \$595. You can reach Sun at 801/752-7631.

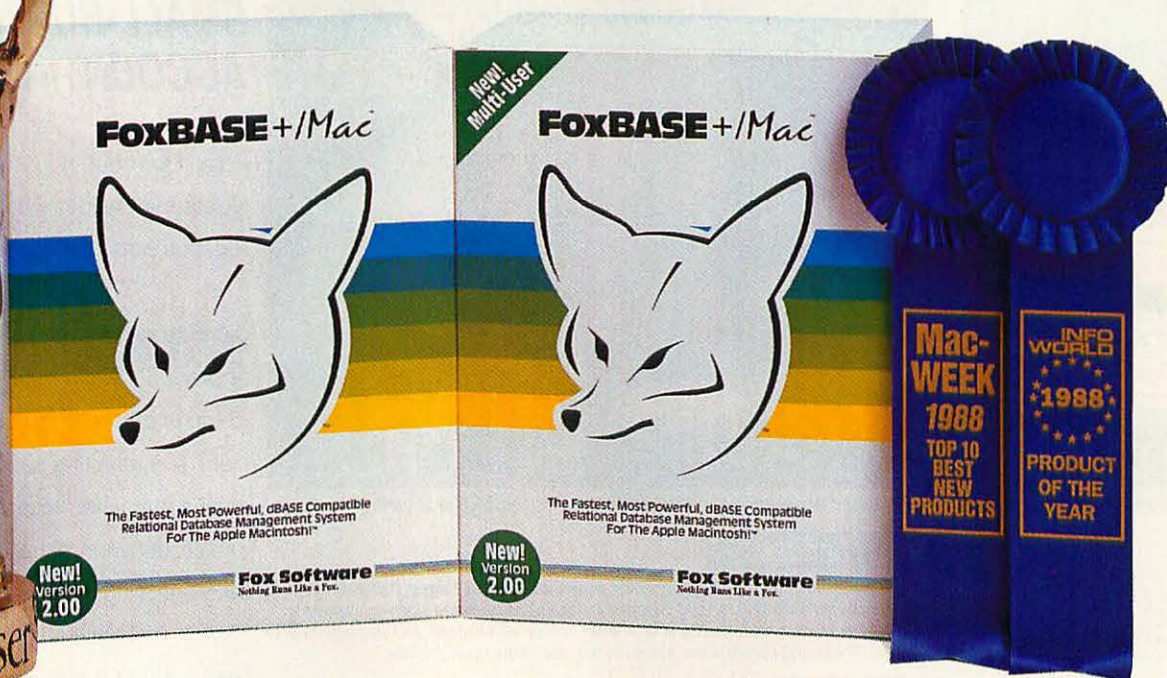
### USER GROUP NEWS

Silicon Valley recently gave birth to the Women's Computer Society. The non-profit organization is designed to support and educate women who use computers and to draw more women into the ranks. Several computer special-interest groups are planned; the first is the Women's Macintosh User Group. Contact CWCS president Rita Zokaei for information, at 415/574-8225. **M**

.....  
Send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1) or Connect (Branscum). Conversely, drop Conspicuous Consumer a line if a company is ignoring you. I will help solve your problem, if I can. If your user group is sponsoring an event, please get in touch.



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*Macworld / September 1988*

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"I don't know of any other Mac accounting software which contains so many features and modules for the price."

*Computers in Accounting / January 1989*

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*MacUser / April 1989*

"Our favorite package was MultiLedger.... it's the most elegant, usable and Mac-like of all the packages we reviewed.... CheckMark offers unlimited free telephone support to all users. This policy would lead to bankruptcy if the program were as confusing as others."

*The Macintosh Buyer's Guide / Spring 1989*

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# A Crash Course in MultiFinder

MultiFinder works wonders,  
but only if you use it correctly

By Thom Hogan

Every month I get letters and E-mail messages that gripe about MultiFinder-related crashes. The funny thing is that in the past six months I haven't had a single crash I can attribute to MultiFinder. So where are all these crashes coming from?

Let's start our examination by making sure that you know what MultiFinder is. Many users seem to think that MultiFinder is a replacement for the System file. The fact that Apple chose a System file icon for MultiFinder reinforces this view, but it's incorrect. MultiFinder is an application, albeit a special one. Users who have experience on true multitasking machines (like those based on UNIX) make assumptions about MultiFinder that are just plain wrong. In the true sense of the word, MultiFinder is a hack, rather than a carefully designed operating system replacement. (A hack, in its traditional meaning, is an elegant, nonintuitive shortcut to accomplish something that would normally take extensive engineering resources to create.)

Motorola originally designed the 68000 as a VAX-like processor. As such, it incorporated two modes: supervisor and user. The supervisor mode was to be used only by the operating system and provide access to all memory and resources, while the user mode would make available only an

individual program's memory and resources. Because of this design, one program couldn't ordinarily crash another. The program didn't have access to anything except its own memory, so if it crashed, you'd have a crashed application in memory, but everything else would work fine.

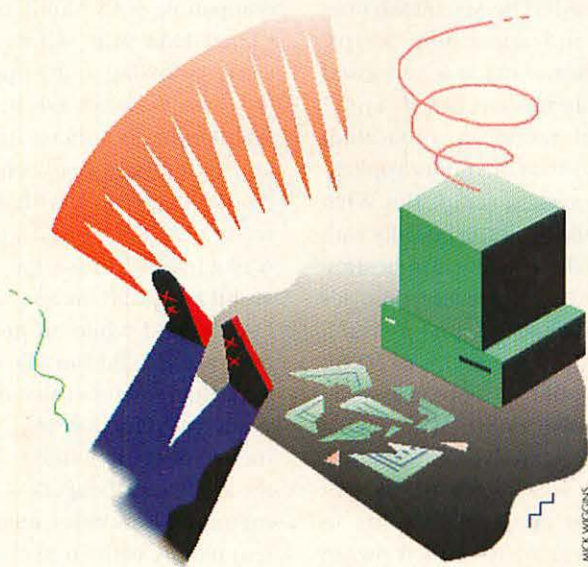
Any Macintosh user can tell you that one program can crash the whole system

under MultiFinder, and one reason for this is that Apple chose to make the Mac run under the supervisor mode all the time. That means that all programs have access to all memory all the time. If a program changes memory not allocated to it, all hell usually breaks loose.

On a Mac without MultiFinder, this usually isn't a real problem. The only things running in memory at any given time are the System and Finder and an application. Moreover, both the System and the application have individual areas of memory to deal with: the System uses the system heap, while the program is supposed to only make use of the application heap. Well-coded programs designed to the specifications Apple gives in the *Inside Macintosh* volumes should have no problems in such an environment—the only real way to crash the computer is to write code that accesses memory it shouldn't (by design or by mistake), or to ignore out-of-memory indicators.

With MultiFinder resident, things change. Let's assume that we're running Microsoft Word and Excel simultaneously. We now have four things in memory (possibly five if we're printing—more on that in a bit). The System is still there and is still limited to the system heap. The two programs are in the application heap, with MultiFinder riding herd on which should get what chunks of memory when. In effect, MultiFinder is mimicking the System's job in allocating the application-heap memory. The crucial difference is that the System only had to dole out one chunk of memory to one program; MultiFinder has to parcel out that same chunk to as many programs as you try to load.

All of which causes problems. In the best of all possible worlds a program would ask for only as much memory as it needed to start, and request more memory as it required additional space. If it came to a juncture where it needed more memory and couldn't obtain it, the program would simply ask the user to remove one of the



AMCK WIGGINS



[illegible]

other programs from memory. But that's not how MultiFinder works. Instead, MultiFinder requires that each program make known its desired partition size when it starts up, and MultiFinder then maps that much memory to the application (if the memory is available—otherwise it tells you it can't run the program).

This method of memory allocation would work fine if MultiFinder didn't play additional games with memory. Background printing, for example, attempts to grab additional memory when it has a big job to print. Under certain circumstances Backgrounder, the utility that handles background printing, can actually cause a program to quit unexpectedly or otherwise crash.

Now add to the already muddy picture of what's happening in memory a handful of INITs and DAs, and you'll find that the combinations and permutations of memory requirements are beyond MultiFinder's capabilities. But let's not stop there. The original versions of Word and Excel (through 3.01 and 1.5, respectively) were real memory weirdos. Due to the way they were created by Microsoft, Word and Excel absolutely required that they be resident in the first 1MB of memory. But wait a minute, you say, your System file alone is approaching 1MB, right?

As if that isn't enough, consider the scrap (the Clipboard). The Macintosh uses separate system and application scraps. When an application starts, it is supposed to convert the system scrap into its application scrap; and when an application quits, it is supposed to convert its application scrap into a system scrap. But what happens under MultiFinder, especially with large scraps? Well, a polite application does the scrap switching every time it's deactivated or reactivated under MultiFinder. After all, one of the joys of MultiFinder is being able to cut and paste between programs, right? Well, what happens when the scrap has 50K of information in it and you switch to another program? The first program converts its 50K into the system scrap, which means you need 100K of memory to do the conversion (I'm simplifying a bit) because the System will need to allocate memory to accommodate the copy. But the system

heap only understands unformatted text, so many programs keep their application scrap around so that when you come back, the formatting information isn't lost. Yup, you guessed what's coming: it is possible to get into a situation where there's not enough memory for Multi-Finder to assign to the new scraps. This is one reason why some programs (like Microsoft Word) display dialog boxes that ask you if you really want to convert or save large scraps.

The secret to using MultiFinder effectively is in knowing just how memory sensitive your software is. Some of this can be gleaned from carefully reading the manuals; some of it must be divined. Here's what I know about what's happening internally in memory and how to minimize the conflicts.

- Make sure that you use only Word 4.0 and Excel 2.2. I guarantee that earlier versions of these programs will at some point greet you with the program-unexpectedly-quit message. You'll lose whatever data you entered since the last Save, and sometimes you'll find that other programs have crashed as well. This warning also applies to other programs that predated MultiFinder. Many of the earliest Mac programs used sneaky tricks to enhance performance or increase memory availability. Many of those tricks are incompatible with MultiFinder.
- Load DAs only when the MultiFinder icon is showing in the upper-right corner. DAs can be accessed at any time within MultiFinder, but there appear to be some key differences between the way MultiFinder handles DAs that are loaded directly from the System and Finder and the way it handles those that are loaded when MultiFinder and an application are active. DAs loaded while an application is running are handled much like any application. But remember that most DAs weren't written to function like an application—they expect to be in the system heap, not the application heap. DAs' crashing through memory boundaries seems to be a problem mainly with large ones (those greater than 32K), but I've never had a problem with any DA when I load it from the Finder.

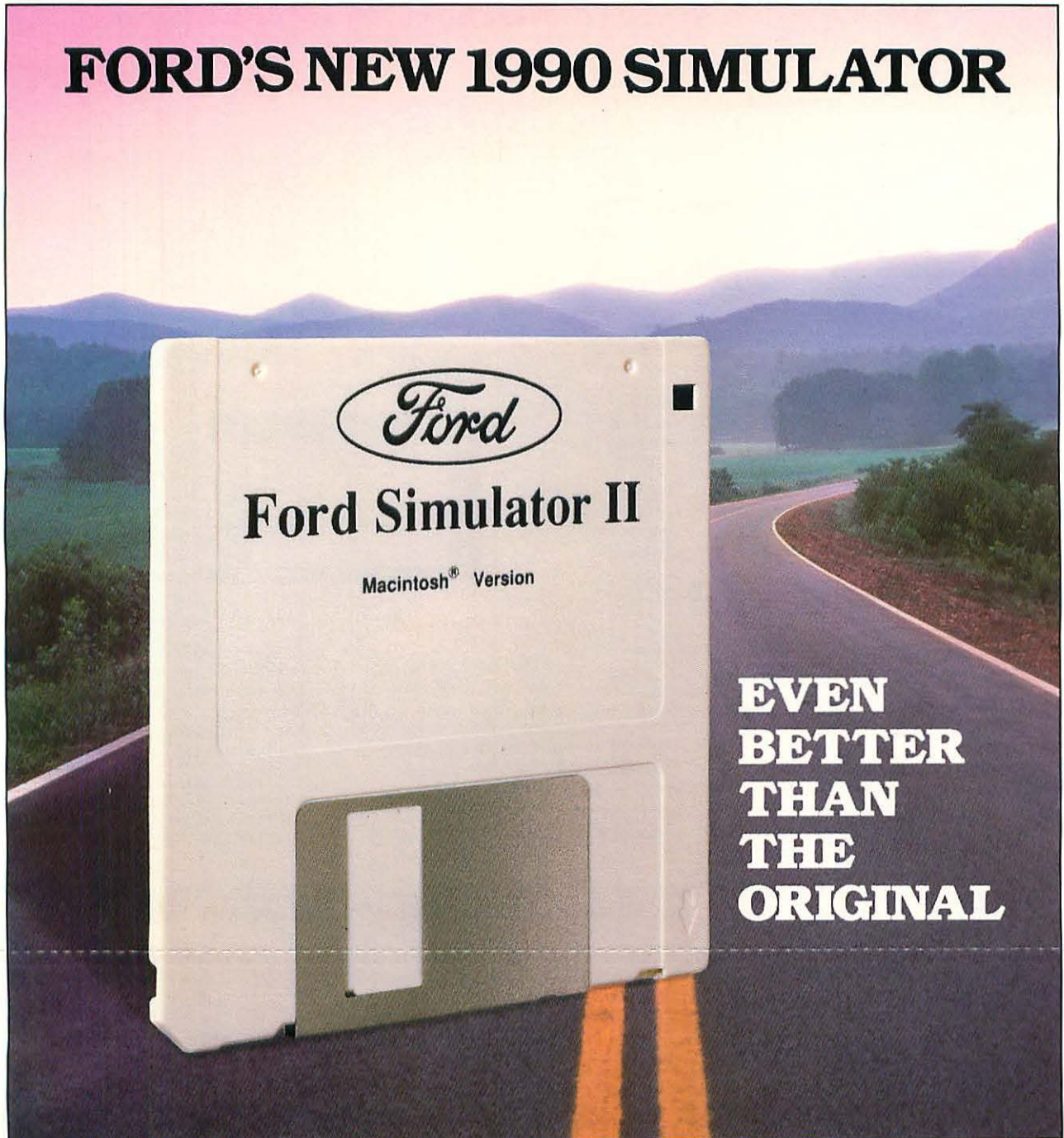
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Volume 1, Number 2

# AUTOMOTIVE TODAY

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# Ford's New Simulator

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### Terrific graphics show off the cars...and show how they work.

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The new graphics are right out of a showroom brochure, and depict the cars in all their glory. Animated screens demonstrate various features of the cars. For example, you'll see heated windshields melt snow, air bags inflate, and supercharged engines propel automobiles down highways.

### Exciting games put you in the driver's seat!

Don't get us wrong; this software isn't only information. This year, there are three exciting driving simulation games, each with three

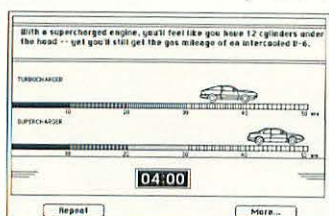
levels of driving expertise.

*Test Track* offers a drag strip; a track inundated with tight turns; and an obstacle course littered with pylons. *City Challenge* lets

you wind your way through traffic en route to your choice of a downtown area, a shopping mall or the airport. And *Back Roads* puts you on an easy-going byway, a twisting blacktop, or a two-lane road that

requires you to maneuver around slow-moving trucks.

And you can play the games with a mouse or a keyboard.



### An easy way to get the facts about our vehicles.

For 1990, the Ford Simulator menu contains almost every model produced by Ford Motor Company,

from the Ford Festiva to the Lincoln Continental. For each, you'll see the manufacturer's suggested retail prices, passenger and cargo



capacities, available models, engines and transmissions, estimated fuel economies and more.

### A friendly spreadsheet helps you figure out the cost of your dream car.

Once you select the right car or truck for you, the "Buyer's Guide" lets you add options. When you're done, you can view financing and leasing options, and even compute monthly payments.

In short, the 1990 Ford Simulator II lets you do just about everything but drive out of the showroom. And it costs just \$6.95; at this price, the Ford Simulator may just be the best buy in the auto industry!

The Ford Simulator II requires a Macintosh 512K, Plus or SE (800K), or an IBM or compatible PC (with at least 512K and color graphics).

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Model MSRP	\$15,400
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Destination and Delivery Charge	\$ 95
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Estimated Down Payment	\$ 3,500
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My computer is ☐ Macintosh

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My disk drive size is ☐ 5 1/4" ☐ 3 1/2"

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## Why Ralph Volk cancelled Linotype for a Varityper PostScript® Imagesetter

*"I made head-to-head comparisons between Linotype® and Varityper® PostScript imagesetters for the same jobs. What I found, more often than not, was that Linotype produced a 1 point miss or overlap at what looked like uniform intervals on the page. I'm told this banking is a result of their start-stop scheme and that it will only get worse as the equipment gets older. Whatever it is, the results are unacceptable for my work, particularly my color work. On the other hand, Varityper produced flawless, high quality output at speeds much faster than those other guys. And when I found out that I could get the Varityper for substantially less money, there was no contest. . . . I said, buy the Varityper!"*

*"My advice to anyone looking for a high quality PostScript imagesetter: Do yourself a favor. Consider Varityper and make your own comparisons."*

*See for yourself. Just call and we will send you output samples from Varityper imagesetters. You'll see the quality difference for yourself!*

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## A Clarification

The Varityper advertisement reproduced above appeared in the June, 1989, July, 1989 and August, 1989 issues of MacWorld. The advertisement inaccurately portrayed the comparisons conducted by Varityper's customer, Ralph Volk, in his evaluation and purchase of a PostScript imagesetter. Mr. Volk neither had nor cancelled a purchase/license agreement for a Linotype PostScript imagesetter. He did not test Linotype's current PostScript imagesetter, the Linotronic 300 recorder with RIP 3 processor, and he made no head-to-head comparison of that imagesetter with the Varityper 4300P PostScript imagesetter. We regret these inaccuracies and any confusion they might have caused.

Varityper's message, then and now, is that before you conclude the purchase of a PostScript imagesetter, make your own comparisons. We urge you to speak with representatives of Varityper and Linotype and accurately evaluate each company's products.



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▪ Do some calculations before you set the partition size for any application (you set partition size in the Get Info box for an application). Do not trust the publisher's minimum-partition-size specifications unless you know you're going to be creating documents that will fit in that amount of memory. Case in point: an 8-bit full-page color image takes up 3,680,416 bytes. Don't expect a 1024K MultiFinder partition to be enough. In general, I calculate the largest-size document I expect to create and add that number to the suggested minimum partition size under the assumption that the program and miscellaneous information (window size, styling, options, and so forth) will take up all the minimum partition size. Sometimes I go even further and make duplicate copies of a program with different partition sizes (you'll find SmallStudio/8 and LargeStudio/8 on my disk, for example, with the partition size being the only difference between them). Just make sure you start up the appropriate one for the work you anticipate doing (names are everything, here). There are exceptions to note, however: most word processors and databases use a form of virtual memory and thus usually work just fine in their minimum suggested sizes. (One exception is FileMaker, which seems to have major problems when you delete records in small partitions.)

▪ Watch your Clipboard use. Unbeknownst to you, that Clipboard may end up being copied back and forth between applications and MultiFinder as you switch between applications (this explains part of the delay that sometimes occurs when you make the switch). If you've copied something to the Clipboard in one program for pasting into another, fine. Try to keep such copies to manageable sizes, however. Don't take a 40-page Word document, copy it to the Clipboard, and then paste it into PageMaker (the appropriate method here is to save the file and then use PageMaker's Place command). But as long as you're dealing with small amounts of information, don't worry. On the other hand, if you know you've been copying big chunks of data to the Clipboard and don't intend to paste any of it into another program, select a null or small item in your

data and copy it to the Clipboard *before* making the application switch. And, should you ever get a message asking if you want to save or convert a Clipboard, stop to think about what the application is telling you before you mindlessly hit the Return key to accept the default. The crash you save may be your own.

▪ Use MultiFinder only when you absolutely have to. My preference, like that of many experienced Mac users, is to set the start-up condition as being Finder Only. I keep the MultiFinder icon out on the desktop (usually on the right, under the disk icons). To run MultiFinder at any time, I simply hold down the Option and ⌘ keys and double-click on the MultiFinder icon. So, most of the time I'm working in a single application under the Finder; but if I have to use MultiFinder, it's just a double-click away, which sure saves rebooting and resetting the start-up item all the time. Unfortunately, one of the INITs I added recently put a halt to this convenient scheme, so now I do the converse: I set MultiFinder as the start-up item; then if I know I'm not going to need MultiFinder in my upcoming computing session, I hold down the ⌘ key while I turn on the machine, which forces Finder to load instead. Not quite as convenient, but still a worthwhile shortcut.

▪ Get more memory. There seems to be enough anecdotal evidence to justify such a move. MultiFinder is virtually useless in a 1MB Mac—there just isn't enough software small enough to load into the minuscule amount of memory available once the System, Finder, and MultiFinder have all finished loading. The curious thing is that most users who have only 2MB of RAM seem to complain about MultiFinder crashes, while those of us with 4MB or more don't. An informal survey of readers of my newsletter showed that about 75 percent of those with MultiFinder problems had only 2MB of RAM. Not exactly a scientific study, but my own experience backs it up: I had numerous problems with a 2MB Mac II last year, but almost none when I stocked the same machine with 5MB this year. It very well may be that in minimal RAM conditions, MultiFinder just doesn't have enough memory to effec-

*(continues)*



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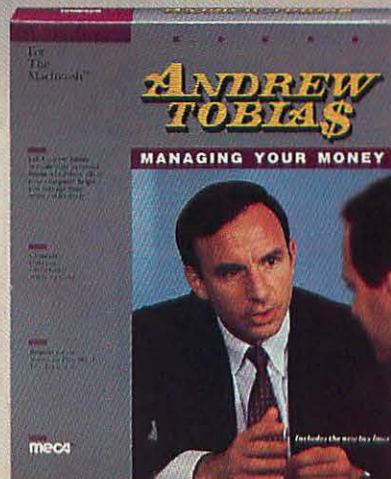
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tively juggle all the pieces you've asked it to. The more memory you have, the more likely that MultiFinder can find a chunk of memory the size it needs (at least in theory). With memory at \$100 per megabyte and still dropping, there's really no excuse to starve MultiFinder.

- Reduce your use of INITs and other accessories, and watch for the bad seeds. I like INITs as much as the next person, but they sure can be a pain in the neck if you're not careful. Take, for example, ColorSnapShot, an F-key I recommended early last year in a Mac II utility article. It turns out that ColorSnapShot has some memory problems, and every now and then its use results in the bomb box.

Be careful about assuming that the currently running application or INIT is the one causing the problem. I isolated ColorSnapShot by removing one thing from memory at a time until the problem disappeared, and then used TMON to trace through the suspected culprit until I was sure that it was the one causing the problems. Using TMON is probably too complicated for most Mac users, but taking one INIT out of the system at a time isn't. Here's what you do: take one INIT out of your System Folder (I usually drag it to a folder called Hide). Restart and run as usual. If you still experience a crash, put that INIT back in and drag out another one; if not, then you've probably identified the culprit. Get rid of it permanently. If you somehow manage to go through all the INITs and still have a problem, you've probably got an interaction effect going on, and you'll have to try removing two things at a time—the combinations start to add up quickly at this point, so you might just want to learn to live with the problem.

- Save your work before leaving one application for another. Crashes under MultiFinder generally tend to happen at a predictable point: the changeover between two programs, or shortly thereafter (in this context, DAs, including the print spooler, count as programs). Thus, I've developed a habit of saving before every Print command and saving before toggling between applications. If I do crash, at least my work is saved. Always save your work before using any DA if you want to play it safe.
- Change between applications using any

of the controls on the menu bar, not by clicking on a window on the desktop. I used to just click on whatever window I wanted brought to the top under MultiFinder—after all, the Apple manuals say you can do this, right? Theoretically, all applications know how to process such clicks, and MultiFinder does all the task switching correctly. I'm not so sure anymore. I've never had a problem when I switch tasks by clicking on the miniature program icon in the menu bar, but I have had problems with some combinations of programs when I've tried to switch by clicking on windows in the desktop. Once again, experience wins out over rationale: do what works, not what the manual says.

- Be aware that MultiFinder lets you do some things that aren't really kosher. Font installation is one such item. With programs like MasterJuggler and Suitcase, it is possible to add and remove fonts at virtually any time. The problem is that most applications only look to see what fonts are available when they first start up. Thus, if you load four programs via MultiFinder and then decide to add a font with MasterJuggler, those programs may not know about the new font. Worse still, if you get rid of a font, the minute they attempt to reference it, they will be referencing nonsensical information, and all hell can break loose. To their credit, all font-installation programs I know of warn you about this potential problem, but a warning is not the same as a lockout. Get used to reading dialog boxes and you might have fewer problems.

Using MultiFinder doesn't have to be a pain. Since I started following the suggestions above, I haven't had a single MultiFinder crash that couldn't be traced directly to a bug in a particular program. Of course I'm knocking on wood right now, since the superstitious side of me says that by making such a blanket statement I'm setting myself up for a crash the very next time I O•&)•D slkfls•(EGF )S•sgsl

*Thom Hogan is president of Maccreations, a Macintosh software developer; publisher of The Macintosh II Report; and author of Programmer's Macintosh Sourcebook (Microsoft Press, 1989).*



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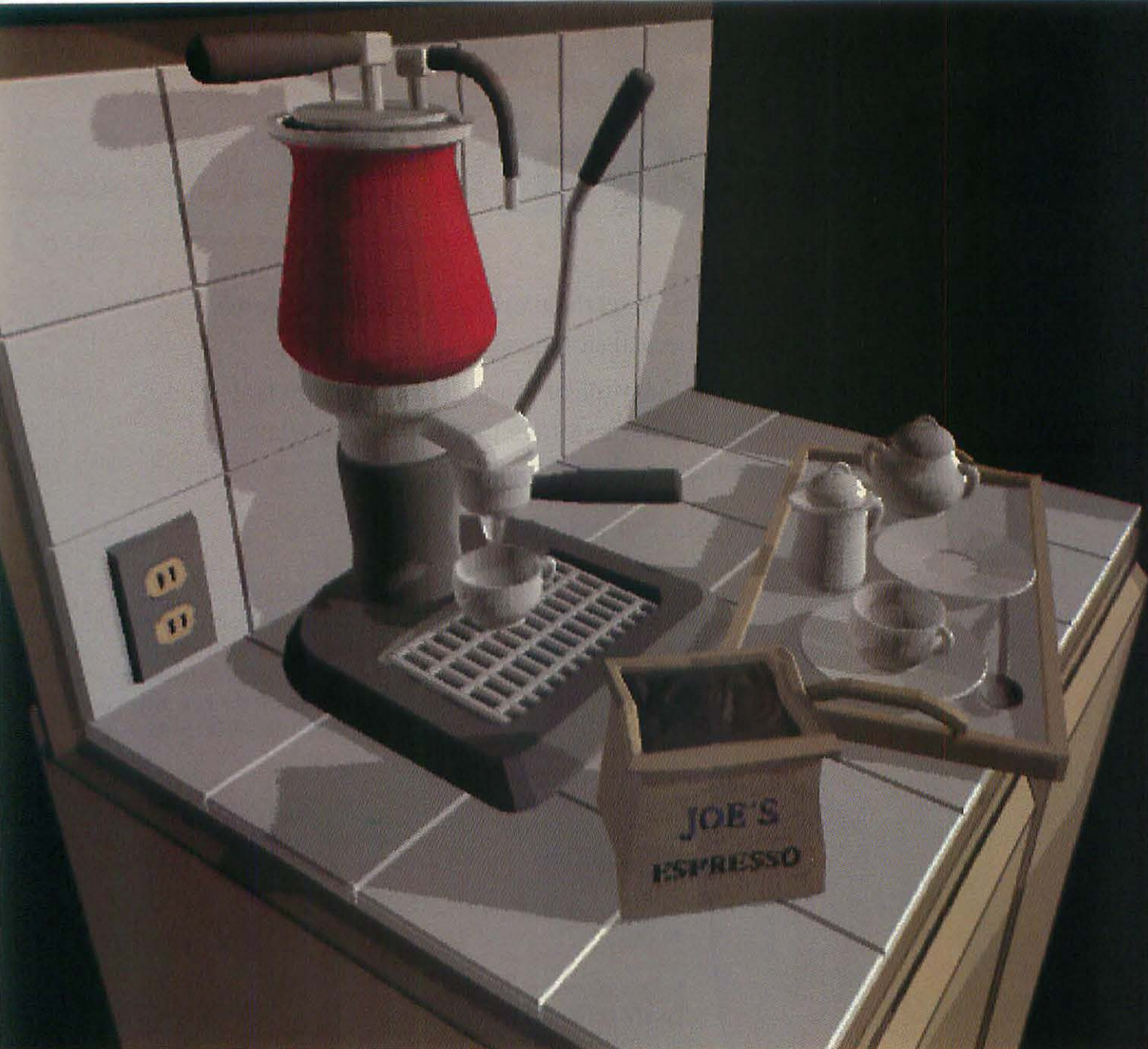
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# MACWORLD NEWS

by Dan Littman and  
Tom Moran

## SuperMac Speeds Up QuickDraw



Breaking a year-long drought during which it introduced no hardware products, SuperMac Technology has introduced the Spectrum/24 Series III, a 24-bit graphics adapter that speeds up QuickDraw operations by as much as 20 times, even on 19-inch monitors. Acceleration for the average application should be about 5 times, the company says. Although some Macintosh users are happy just to be able to work in 24-bit color, many find that their systems drag because of the huge data transfers required when each pixel of a large screen commands 24 bits of information.

SuperMac addresses the problem by executing all QuickDraw primitives in special ASIC (application-specific integrated circuit) chips on a module attached directly to the graphics adapter board. The primitives are the routines for drawing geometric shapes. The board runs QuickDraw faster partly because the ASICs are designed for that purpose only and therefore do not have the overhead associated with a separate microprocessor and its



Steve Edelman and Mike McConnell of SuperMac show off the Spectrum/24 Series III accelerator for QuickDraw.

software. Also, because QuickDraw operations are done on the adapter board itself, it's no longer necessary to constantly send huge amounts of data over the NuBus bottleneck between the Macintosh's CPU and the monitor. The new technique is completely compatible with 32-bit QuickDraw and has passed scrutiny by Apple's QuickDraw engineers, according to SuperMac.

The difference in performance can be dramatic: when dragging a section of 24-bit graphics, the subsystem constantly updated the screen in real time, resulting in smooth motion. The same SuperMac subsystem with the acceleration turned off showed only

an outline box when moving and filled it much more slowly when the graphic was put in its final position.

The Spectrum/24 Series III supports up to a 1024-by-768-pixel display and refreshes the screen at either 60Hz or 75Hz, depending on the monitor. The adapter board is expected to have a retail price of \$4499. Other products announced by SuperMac include a \$3200 color display based on a 19-inch Hitachi tube, the \$1899 Spectrum/8 Series III 8-bit adapter board, and a \$4200 color display based on a 19-inch Sony tube. The new devices all support a 75Hz refresh rate and were all scheduled to

begin shipping in November.

SuperMac is also shipping its ColorCard/24, a 24-bit color adapter board for the Mac II series that has a list price of \$999, matching the trend-setting cost of RasterOps' 24-bit ColorBoard 264 board. Like the RasterOps board, the ColorCard/24 does not support displays larger than 13 inches. However, for \$499 the ColorCard/24 can be upgraded with the same accelerator module used in the Spectrum/24 Series III board.

—Tom Moran

## Growing Lettuce on Mars



The simulation modeler Extend is helping engineers at Lockheed figure out how to grow food and keep people healthy in space. Steven Schwartzkopf and Mel Cobb, staff engineers at Lockheed, are working on a project called Crew and Specimen Life Support, which Schwartzkopf said "simulates an entire biological life-support system for advanced space missions." Lockheed is a major contractor for Space Station Freedom, the joint U.S., Japanese, and European permanent space station projected for the mid-1990s.

Lockheed, Schwartzkopf said, is "attempting to design (continues)





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a life-support-systems designer toolkit, so an engineer who wants to design life-support systems—for space use or anything else—could sit down at the computer without knowing about the details of each life-support system, hook the subsystems together and . . . test hypotheses about the system's design."

The Extend simulation that he and Cobb have built uses blocks that represent several crops, human and plant waste recycling systems, air, water, and other parts of a closed environment. Each block uses Extend's underlying C-like language to convert the engineers' expert knowledge into math describing the function it models. For example, the block simulating soybean cultivation has to account for the crop's use of water and its impact on oxygen, carbon dioxide, and nitrogen in the air, as well as predict how much usable protein the crop will produce over time. The blocks are linked together, and as the simulation runs it feeds the numbers into a block that generates graphs, which Cobb drew to resemble an oscilloscope. The graphs make it easy to see logical errors in the simulation, such as a diminishing water level, or potentially dangerous assumptions, such as allowing the oxygen level in the air to sink too low.

Extend 1.1 lists for \$495. Its publisher, Imagine That, plans to release several add-on block libraries. The Generic Library and the Discrete Event Library will be bundled with Extend or available to registered owners at \$30 for both. The Generic Library is



Steven Schwartzkopf and Mel Cobb stand in a full-size model of the permanent space station that Lockheed is helping to design.

for businesspeople; it contains blocks that read data from files, generate random numbers, do plotting and statistics, and perform other financial functions. The Discrete Event Library is targeted at simulating entities flowing through a system, such as customers through a retail operation or phone calls through a switching network. The Manufacturing Library will cost \$297 and require a copy of the Discrete Event Library. For more information, contact Imagine That in San Jose, California, at 408/365-0305.

—Dan Littman

## Tektronix Color Ink-Jet Does PostScript



Tektronix recently brought out a Color PostScript-compatible ink-jet printer that accepts A- or B-size paper and lists for \$8995. Called the

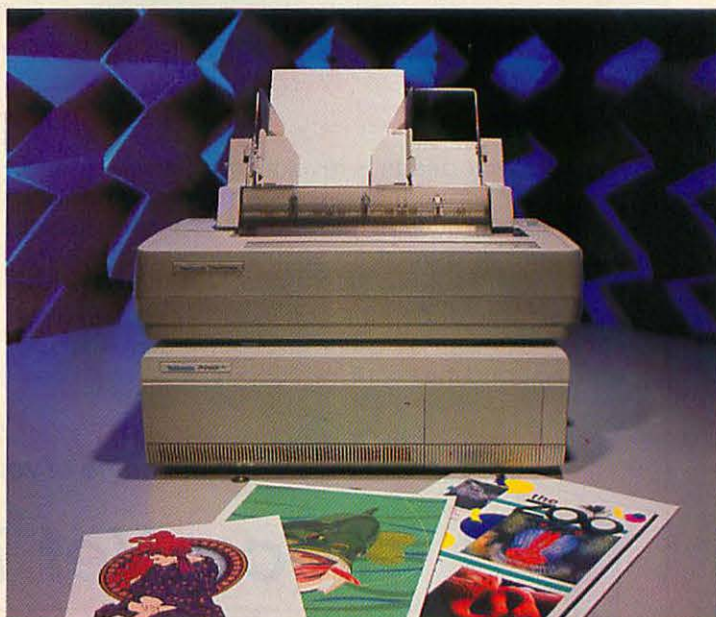
Phaser CQS, it prints 2 pages per minute at a resolution of 216 dpi on paper or a special, coated film.

The Phaser CQS runs Tektronix's own Color PostScript-compatible interpreter, which the company says can be set up to drive various color or

monochrome output devices. The printer incorporates 35 typefaces that match those on Apple's LaserWriter but were licensed from the original trademark holders instead of from Adobe. The Phaser CQS is designed to accept Adobe Type 1 and standard Type 3 downloadable fonts.

Designed for tabloid printing in networked environments, each Phaser CQS comes with a Tektronix PrintStation, an AppleTalk device that includes a 40MB hard disk and spooling software. The PrintStation spools files for up to eight printers, including one additional Tektronix color printer.

An automatic sheet feeder, included with the printer, handles sheets up to 12 by 18 inches. The Phaser CQS can produce an 11-by-17-inch image on those sheets without losing any of the image. Tektronix slated the printer to begin shipping in January. The company also reduced the price of its 300-dpi color (continues)



The Phaser CQS color printer runs Tektronix's own Color PostScript-compatible interpreter.



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thermal-transfer printer, the Phaser CPS, from \$15,995 down to \$12,995. For more information, call Tektronix in Wilsonville, Oregon, at 800/835-6100—T.M.

## Geographic History on TV



For history students who get to use GTV, "hit the books" will soon mean tune in the TV, turn up the sound, and boot up the Mac.

GTV, A Geographic Perspective on American History is a joint National Geographic-Lucasfilm project aimed at kids in grades 5 through 12. It is designed for historical exploration and research, classroom presentations, and multimedia composition. The package—which includes two laser disks, HyperCard stacks, a teacher's guide, and a cable—should ship in April for about \$650. It requires a Mac Plus running HyperCard, a laser disk player, and a TV monitor.

The HyperCard database that drives the laser disk player contains images, captions, and annotations for the segments, as well as more than 200 maps. A student or teacher can use the database to search for information about a topic; and then select, rearrange, and annotate clips and stills to create a new presentation.

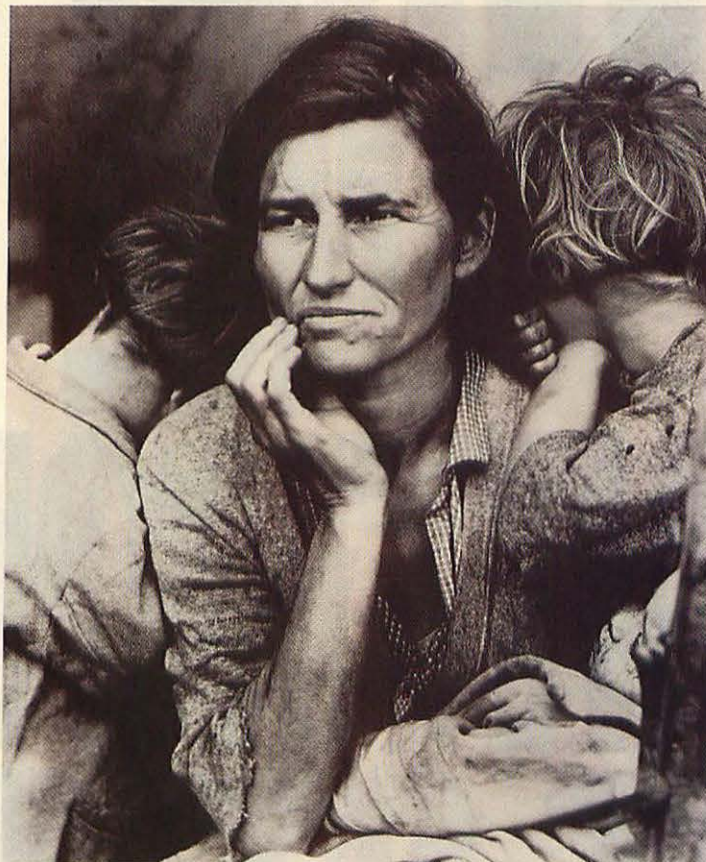
The two-hour laser disks have film clips and sequences of stills culled from the National Archives, the Library of Congress, and National Geographic's library. They cover topics ranging from pre-Columbian times through the Revolutionary and Civil Wars,

westward expansion, the World Wars, industrialization, and changes in communication. For instance, in one segment, the voyage of Lewis and Clark is portrayed on the TV monitor while a map on

music and is called MapRap.

For more information contact Turner Houston at the offices of National Geographic in Washington, D.C., at 202/857-7245.

—Mary Margaret Lewis



**Migrant worker and child in 1930s California—just one of the images GTV uses to bring history alive for students.**

the Mac traces their travels. The user can select a spot on the map where Lewis and Clark encountered a grizzly bear, and the grizzly bear appears on the video monitor, accompanied by a story.

The segments are brief, the images strong. Clearly, GTV was written with the television generation in mind. If you noticed that GTV and MTV have a similar ring, it's probably not by accident: one animated segment about the United States' early land purchases is even set to rap

## Spanning the Ethernet Gap



Ethernet is finally becoming a viable cable option for AppleTalk networks. The reason? Faster transfer rates and higher bandwidth—not to mention connectivity to UNIX workstations, Digital Equipment Corporation VAX computers, and IBM PCs. Apple now estimates that 5 to 10 percent of all AppleTalk Macs are connected via

Ethernet. A recent *Macworld* survey found that 15 percent of readers used Ethernet to network their Macs.

Shiva Corporation's first Ethernet-based product, EtherGate, is a hardware gateway that allows serial-device sharing and wide-area networking connections between LocalTalk and EtherTalk networks. Basically, the EtherGate incorporates all the functions of Shiva's LocalTalk products—the NetSerial, NetBridge, and TeleBridge—into one box.

The EtherGate includes two Mac DIN-8 serial/LocalTalk-compatible ports, one thick Ethernet port, and one thin Ethernet port. Only one Ethernet port can be used at a time. The Mac serial ports, meanwhile, can be used for any combination of LocalTalk connections, serial device connections, or wide-area networking connections. For example, a modem connected to an EtherGate serial port can be shared by users on both EtherTalk and LocalTalk networks. The EtherGate also allows LocalTalk Macs to access Ethernet-based file servers, and remote Macs or PCs to dial in to either network.

Users configure the EtherGate with the Internet Manager application. Internet Manager shows a diagram of the EtherGate's back panel. To configure a port, select its function (LocalTalk, Remote Bridge, or Shared Serial) from a pull-down menu. That information is downloaded into the EtherGate's memory. Should the EtherGate lose power after being configured, the battery-backed RAM saves the configuration, reloading it after power is restored.

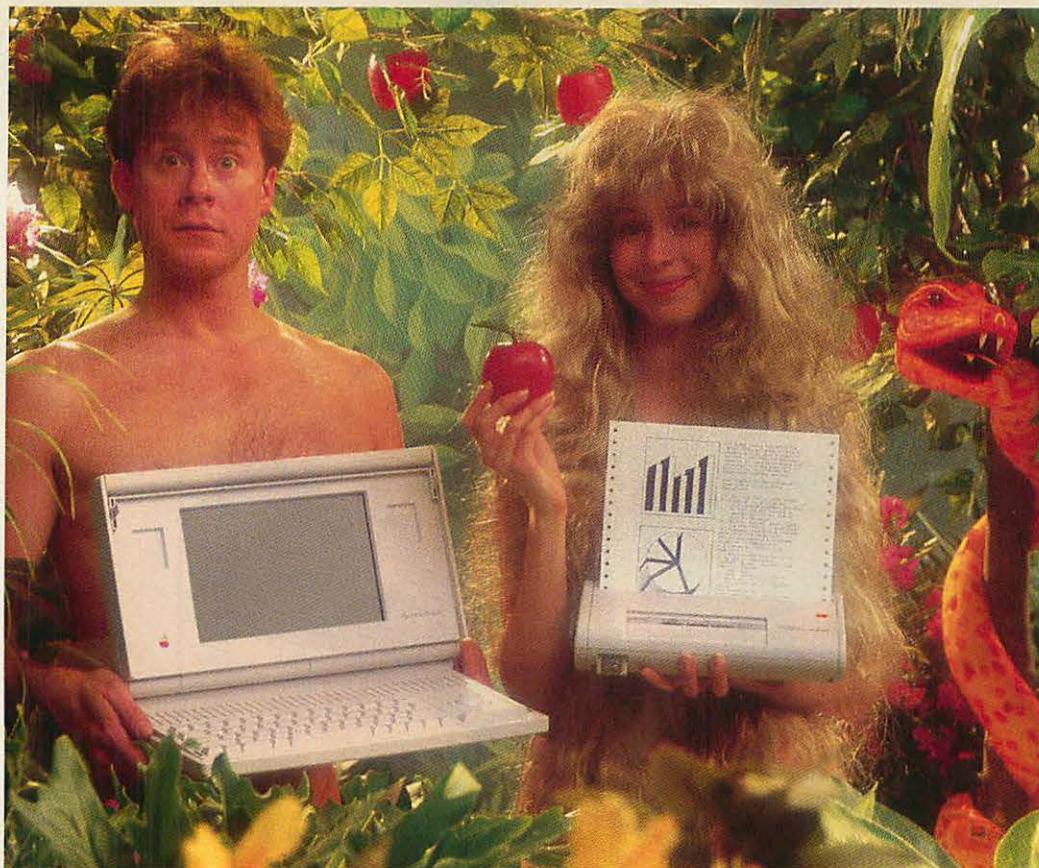
Although the EtherGate (continues)



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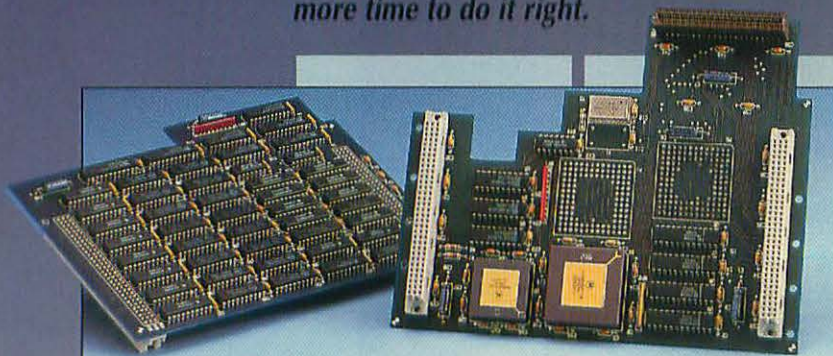
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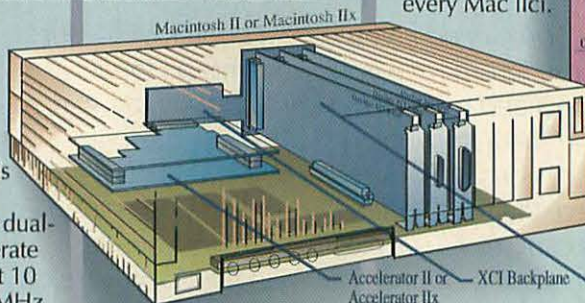
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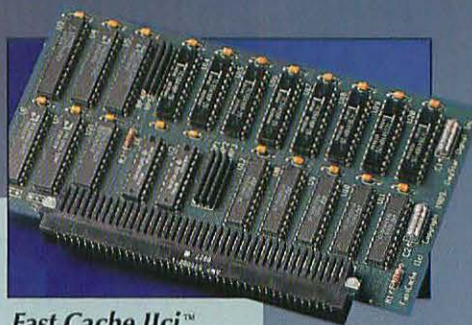
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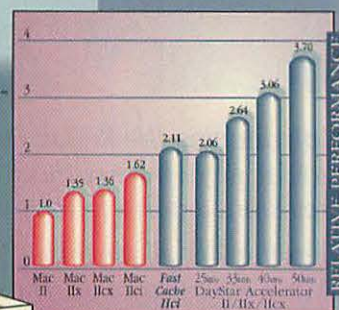
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**Frank G. Slaughter, vice president, engineering, for Shiva, with the EtherGate, which supports communication between Apple-Talk and Ether-Talk networks.**



SETH RESNICK

will initially support only EtherTalk and LocalTalk networks, Shiva does plan to develop additional software modules—also downloadable with Internet Manager—to allow EtherGate to work over other network systems. Network protocols currently under consideration include IPX for DOS and NetWare; TCP/IP for UNIX; DaynaTalk; and FlashTalk. EtherGate is available now for \$2399. For more information, contact Shiva Corporation in Cambridge, Massachusetts, at 800/458-3550.

—Brita Meng

## In Focus Offers Interactive Color Projection



In Focus Systems has devised an eight-color LCD panel that permits interactive color presentations when used with an overhead projector. Called the 480C PC Viewer, the panel produces black, white, red, green, blue, cyan, magenta, and yellow at 640

by 480 resolution.

Presentations for the 480C PC Viewer can be created with any color software that runs on either a Mac or a PC, the company said. For interactive presentations, where information is likely to change as a meeting progresses, the Mac or PC must be connected to the LCD panel. However, the 480C PC Viewer has enough memory to store images and operate without having a microcomputer attached.

The color panel has three LCD layers: cyan, magenta, and yellow. It uses the subtractive method to obtain the eight displayable colors. As a result, each LCD cell displays one of these colors directly, without having to use several adjacent cells to produce a dithered color. The cell-dithering method of generating colors can cause jaggies.

Slated to begin shipping in early November, the 480C PC Viewer retails for \$4995. For more information, call In Focus Systems in Tualatin, Oregon, at 800/327-7231, or at 503/692-4968 in Oregon.

—T.M.

## Bait for Thought

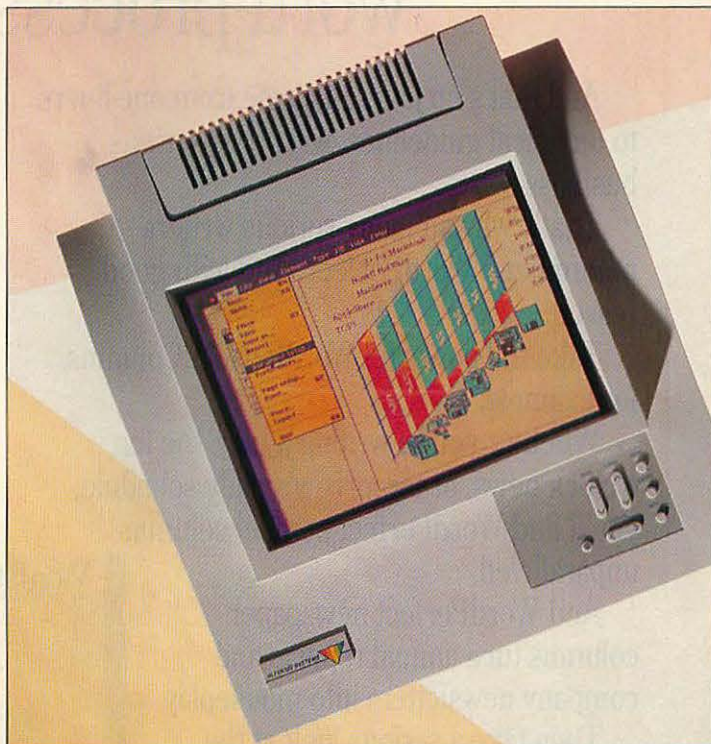


A group of literary-minded developers spent 12 years contemplating the world from an island in Hawaii and spawned an odd but intriguing text-based brainstorming tool. IdeaFisher breaks 60,000 words and phrases into 28 rough categories and 386 subcategories, and ties them together with 705,000 links and associations that jump from one idea to another.

For example, you might open the Idea Bank and enter the word *red*. As dozens and dozens of possible associations scroll by, you pick out a few that seem to lead in the right direction—maybe *tomato*, *Lucille Ball*, *communists*, and *ruby*. While you consider these words, a notebook running in the background keeps track of your choices and the categories you pass through.

If you select *Lucille Ball*, you might jump to the “funny” category, or, if to you *Lucy* and *red* mean loud instead of funny, you can add a new subcategory. A set of 3000 questions help you clarify and modify your search and evaluate it in terms of your original purpose.

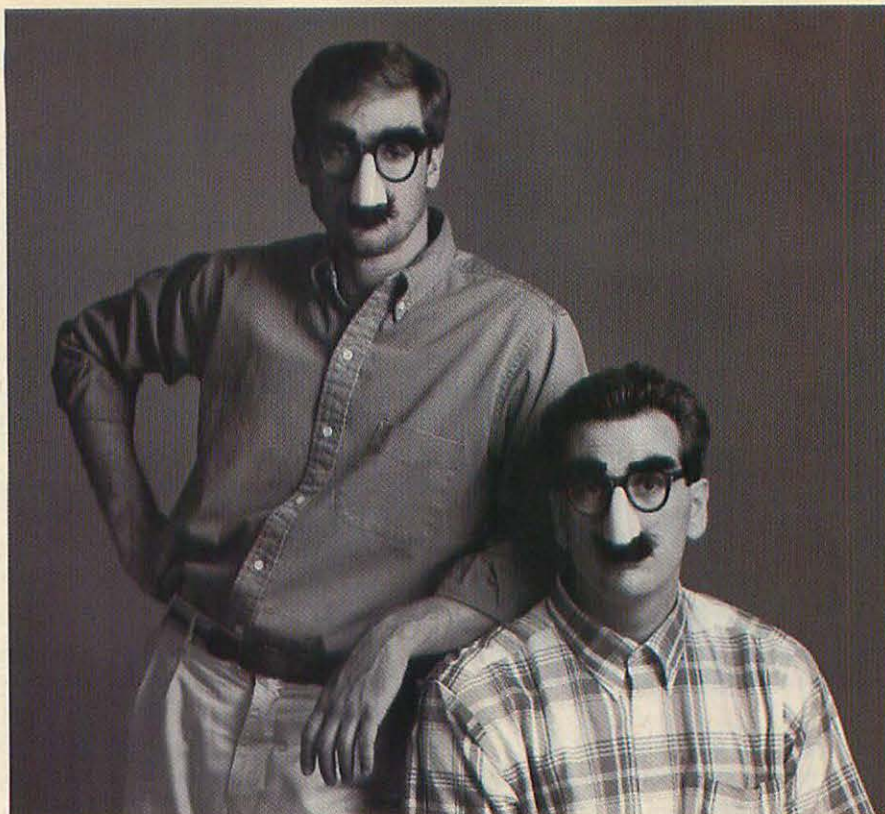
As developers Marsh and Jess Fisher envision it, IdeaFisher belongs in the special think-tank environment that some forward-looking companies have begun to provide, a place where creative types can get away from the telephone and find the lighting, noise level, furniture—and high-tech tools—most conducive to productive brainstorming sessions. Though an MS-DOS version of IdeaFisher shipped several months before the Mac version, the Fishers have found Macintosh users more receptive. (continues)



PIERRE-YVES COMADEC

**In Focus Systems' 480C PC Viewer, a color projection panel that lets you alter a presentation on the fly using a Mac.**





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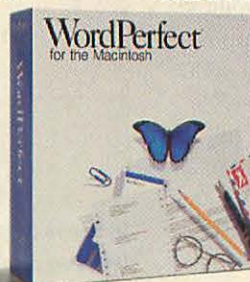
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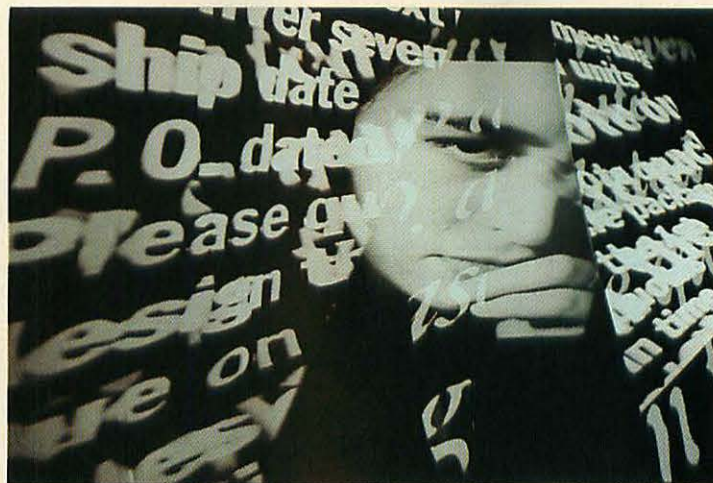
tive to the product, and the pair plans to take advantage of the Mac's capabilities to add sounds and imagery to the idea base.

The Macintosh version of IdeaFisher, which should be available now, requires 1MB of memory and a hard disk. It ships on nine floppies, eats up 7MB of hard disk space, and lists for \$495. Fisher Idea Systems plans to update the database twice a year on a subscription basis for \$149 per year. For more information, contact Fisher Idea Systems in Irvine, California, at 714/474-8111.—D.L.

## GCC PLP II Personal Page Printer



GCC Technologies introduced in late December its PLP II, an LED array-based personal page printer that is the follow-on product to the company's Personal LaserPrinter (PLP). The PLP II produces 300-by-300-dpi output at 4 pages per minute. The printer is designed for home use, small offices, or



**Wandering aimlessly in your mind can be the most direct route to a solution—especially if your Mac remembers how you got there.**

larger organizations where printers are often tied up.

The PLP II's print engine, made by Oki, marks its photoelectric drum with an LED array that takes up less space and has fewer moving parts than a laser printer's optical system. GCC says that the PLP II's cost of consumables should run under 3 cents per page, including paper.

A menu-driven control panel on the front of the printer presents its menus in the user's choice of English, French, Dutch, Italian, or kata-

kana. The front panel also lets you set the SCSI address of the device, which has a removable internal terminator.

The PLP II comes without RAM; the Mac does all rasterization. A 1MB RAM option permits faster multiple copies and quicker release of the computer to other tasks. To save energy, the printer has a sleep mode that cools the fuser element and shuts off the fan. Once in sleep mode, the PLP II takes 30 seconds to resume printing.

At press time, GCC estimated that the PLP II will carry a list price of \$1299. Because GCC sells direct, the printer's street price is expected to be only 10 to 20 percent below the final list price. For more information, call GCC in Waltham, Massachusetts, at 800/422-7777.—T.M.

## The Voice-Mail Network



Mainstay's MarkUp is sporting some new buttons. This editing product, which allows workgroup members to comment on a Macintosh document, is

adding a new tool developed by Discussion Systems. In addition to covering a document with transparent layers, writing on them, and then passing them around on a network, users can now record and play back spoken comments over the telephone. When you click on a voice-note icon, special software sends a message down the network to a voice server, which signals the office phone system to call the Markup user; when your phone rings, you record a message on the server. The process is reversed when you want to listen to a message.

Markup is the first application to use Discussion Systems' voice-server engine, but Discussion Systems president Bruce McHenry hopes other companies will adopt it as well. Application developers have to build hooks for the engine into their applications, but McHenry is counting on System 7.0 to simplify implementation. "We would driverize the audio server," McHenry said. "Then we wouldn't have to link our program with the application—it would be more or less like a print driver."

The voice-server engine supports functions necessary for software-driven voice mail and for voice-document management, such as opening and closing a session; setting phone numbers; and creating, opening, closing, and saving documents. "We want to support the Mac notion that you save your document and everything in it gets saved, including your sound," McHenry said.

The server itself is a DOS or OS/2 machine, but Discussion Systems



**GCC Technologies' PLP II page printer uses an LED array to produce 300-by-300-dpi output.**



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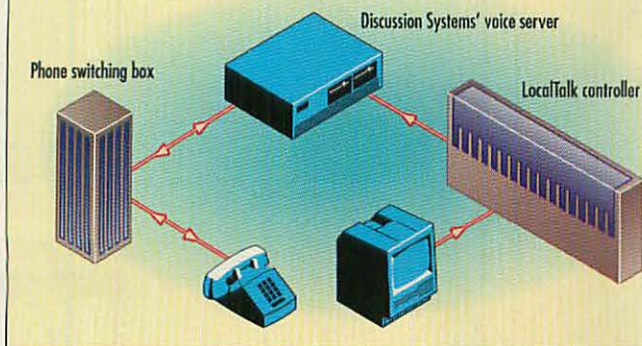
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## MARKUP CALLING



**MarkUp sends requests over AppleTalk for the voice server to signal the PBX, which then records or plays messages via telephone.**

sion Systems plans to develop Mac administration software. At press time Discussion Systems had not named its product. McHenry said pricing for a four-port server that stores about 15 hours of speech, which he considers appropriate for 50 to 100 users, will be less than the approximately \$30,000 cost of equivalent voice-mail systems. McHenry said pricing for Audio Mark-Up had not been set at press time; for more information, contact Mainstay in Agoura Hills, California, at 818/991-6540. For more information about the Discussion Systems engine, contact Discussion Systems in La Honda, California, at 415/941-8003.—D.L.

## Sybase and the Future of SQL Hosts

 Macintosh users trying to access corporate databases on host computers now have a way to access Sybase SQL Server relational databases with Sybase's Open Client application programming interface (API). APIs let programmers develop custom

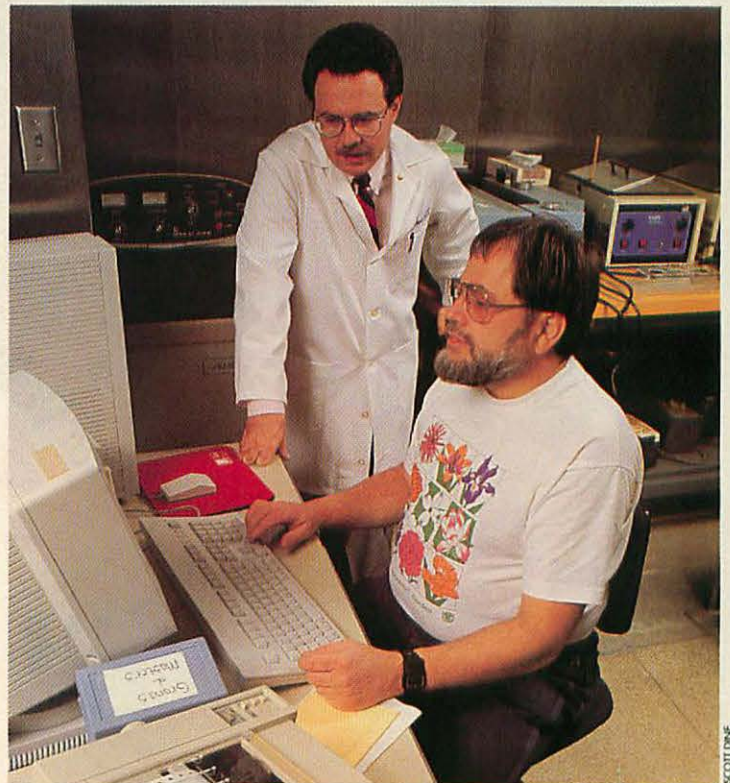
interfaces to existing mainframe or minicomputer applications, and Sybase is offering two versions of Open Client: Hyper/DB-Library, a set of HyperCard XFCNs; and DB-Library, a set of object libraries that can be integrated into any MPW C-compatible application. Both APIs support TCP/IP and DECnet networking protocols and can communicate with SQL Server running on any host computer that also supports those protocols. (Sybase hosts run on a variety of UNIX systems, as well as VAXes running VMS. Another Sybase API called Open Server allows those hosts to tie into non-Sybase servers.)

With Open Client, Sybase joins Oracle, TechGnosis, and Network Innovations in offering structured query language (SQL) network database products. Oracle's Mac API for accessing UNIX-, VAX-, and IBM mainframe-based Oracle databases comes in both HyperCard- and MPW C-compatible versions; and several Mac application vendors, including Acius, Blyth, and Silicon Beach, either have integrated or are integrating

Oracle's API into their programs. Sybase, meanwhile, is working with third parties to integrate its API into Mac applications such as Microsoft Excel and 4th Dimension.

TechGnosis's SequeLink differs from Oracle and Sybase products by focusing only on VAX hosts on AppleTalk and DECnet networks. SequeLink offers SQL links to

allows client Mac applications to access appropriately configured host databases, but Network Innovations plans to offer an IBM mainframe server as well as a VAX server. Ashton-Tate, Fairfield Software, Oracle, and Blyth have announced support for CL/1. Interestingly, Apple owns Network Innovations and holds a stake in Sybase.



**Mark Frisse and Buddy Brownstein plan to use Sybase to catalog artificial chromosomes at Washington University Medical Center.**

a number of database servers—Oracle, Ingres, Rdb, and Sybase—through HyperCard, 4th Dimension, or compiled languages such as Pascal and C. SequeLink requires a server module on the VAX, in addition to the client driver on the Macintosh.

Meanwhile, everyone is awaiting final client and server drivers for Network Innovations' CL/1, the connectivity language billed as a superset of SQL. Like SequeLink, CL/1

The C-compatible and the HyperCard-based Sybase APIs are \$195 each per Mac. For more information, contact Sybase in Emeryville, California, at 415/596-3500; Oracle in Belmont, California, at 415/598-8000; TechGnosis in Boca Raton, Florida, at 407/997-6687; and Network Innovations in Cupertino, California, at 408/257-6800.

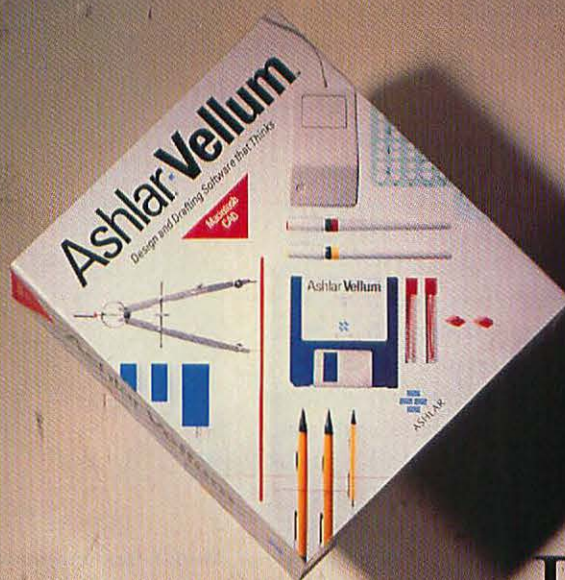
—Brita Meng

(continues)





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## Holy Megabytes! Batman Fights the Evil Virus



Artist and Mac maven Pepe Moreno didn't plan it this way, but his book-length collection of four new Batman episodes will come out just in time to top off the year of the bat. Moreno, who set aside comic-book art years ago for more lucrative commercial work, returns to his roots with *Digital Justice* (DC Comics, 1989), produced entirely on the Mac.

The book, not connected to the blockbuster movie, opens in Megatropolis sometime in the twenty-first century, when Gotham City has evolved into an urban sprawl wired into an omniscient computer network. As you might expect, corrupt forces have gained control of the computer system, which dominates the city like a twentieth-century dictator. To make matters worse, a virus has infected the system, threatening to bring the populace to its knees. Bruce Wayne's legacy, a computer he built in his last days, comes to the rescue, along with a human crime fighter who takes up Batman's cape.

To carry out the theme, Moreno decided to create *Digital Justice* on the Mac from cover to cover. After first making thumbnail sketches to serve as an outline for the story, he then created the buildings, machinery, and backgrounds in the 3D modeling programs Super 3-D and Pro3D (thereby designing the complex images only once). Moreno drafted the human figures by hand on paper and

scanned them into the Mac, cleaned them up a bit in Image Studio, and there added shadowing to make them stand out against the flatter landscape. The graphic distinction of the more rounded human figures is important to the story line, which is populated as much by robots and machines as by humans.

Moreno put the pieces together in Studio/8 where he colorized images and refined them. The process, he said, "gives you a cinematographic look; you can do a double exposure when a character's remembering somebody who died, or if someone has been hit by some sort of microwave radiation, you can use



**Artist Pepe Moreno used the Mac to produce *Digital Justice*, his book-length collection of four new Batman episodes.**

an ImageStudio effect that essentially shakes the image." To complete the project, Moreno took advantage of Grupo Anaya's color-separation software to produce the film used for printing the book.

*Digital Justice* will be available at bookstores in February for about \$25.

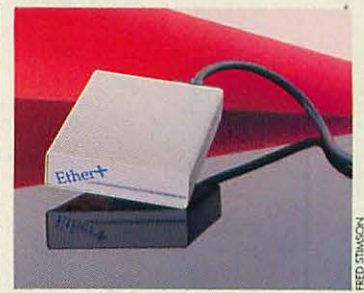
Moreno also plans to release a CD ROM version of the story featuring music, simple animation, and actor's voices in place of the written speech balloons.

—Nancy E. Dunn

## Compatible Systems Links SCSI to Ethernet



For users who want to connect to Ethernet but don't have an available NuBus slot, Compatible Systems Corporation has introduced its Ether+, an external device that links to Ethernet via the SCSI port. At \$495, the Ether+ is also con-



**Compatible Systems' Ether+ connects to Ethernet via the Mac's SCSI port.**

Ether+ also includes software for configuring the device, tracking its operation on the network, and running diagnostics.

Ether+ can operate under several network protocols, including TCP/IP and NetBIOS. Ether+ is available now. For more information, contact Compatible Systems in Boulder, Colorado, at 800/356-0283.—T.M.

## RasterOps Unveils Flicker-Free Graphics



RasterOps Corporation recently began shipping its Professional Series of ColorBoards, a line of 8-bit and 24-bit color subsystems with faster refresh rates and better WYSIWYG capabilities. The Professional Series ColorBoard 708+ is an 8-bit display system for all of the Mac II series; the ColorBoard 708+/SE30 is an 8-bit subsystem for the SE/30; and the ColorBoard 724 is a 24-bit bundle, again for the entire Mac II family. Each of the products in the Professional Series comprises a display adapter board and a 19-inch RasterOps 1960S monitor. The 1960S is a customized version of Sony's Trinitron tube.

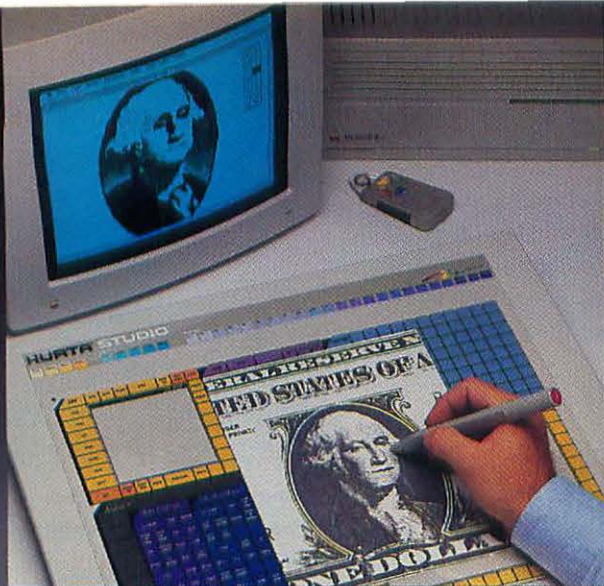
To eliminate flicker, each

siderably less expensive than many Ethernet adapter boards.

Ether+ comes with driver software that meets Apple's EtherTalk link access specifications and can therefore run AppleShare, TOPS, Telnet, and Novell network software at Ethernet speeds, according to Compatible Systems. The



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casual user. The preprogrammed template incorporates Aldus' most commonly used commands, so you don't have to revert to the keyboard for shortcuts. The Kurta Studio even lets you program your own custom routines right on the template.

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# Kurta works.



subsystem's adapter board and monitor support a 75Hz screen-refresh rate. Several other vendors who use Sony Trinitron tubes in their monitors have also recently moved to a 75Hz refresh rate, which at least one company hopes to establish as a standard. If 75Hz does become a standard by default, users could more easily mix and match various companies' adapter boards and displays.

The improved WYSIWYG of the Professional Series results from the products' 72-dpi resolution, which matches the resolution of Apple's subsystems. RasterOps says that the new display adapters are faster and more reliable because they are made with VLSI (very-large-scale integration) technology and improved manufacturing techniques. All the subsystems offer resolutions as high as 1024 by 768 pixels. The two 708+ products provide a choice of 1, 2, 4, and 8 bits per pixel, and the ColorBoard 724 supports those modes and 24 bits per pixel.

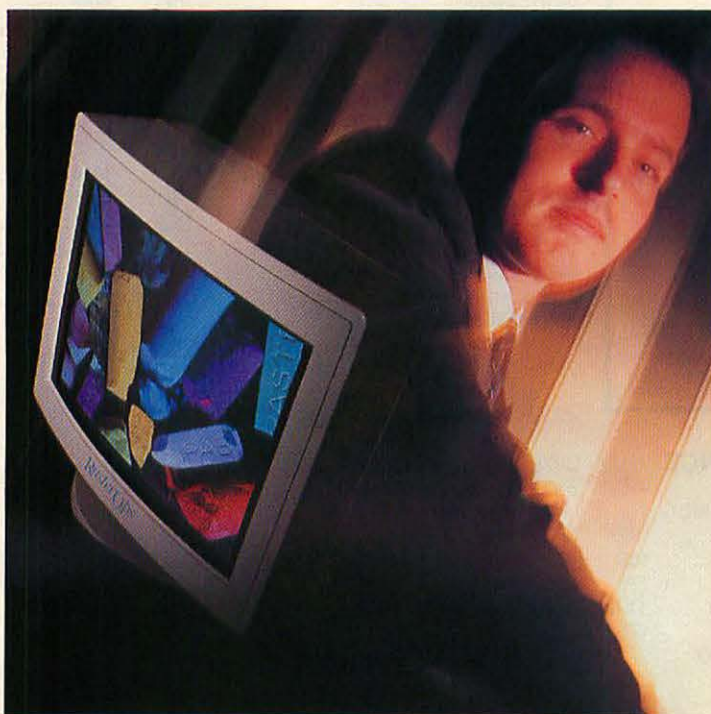
The Professional Series products all come with hardware pan and zoom, extended desktop features, and a tilt-and-swivel monitor stand. The company previously charged \$490 extra for these features.

RasterOps said it would offer its existing 60Hz subsystems for about three months after the introduction of the Professional Series and to reduce the prices of the 60Hz products by about 25 to 33 percent, depending on the product. The ColorBoard 708+ and the ColorBoard 708+/SE30 both retail for \$5790, including 19-inch monitor and system software. The ColorBoard

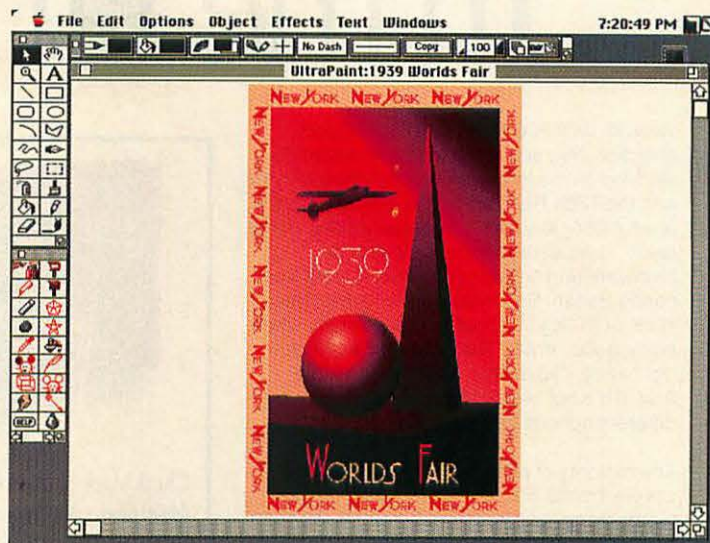
724 with system software and 19-inch monitor lists for \$9390. All three subsystems are available with 16-inch monitors for \$1200 less than the list price for the 19-inch monitors. For more information, call RasterOps in Santa Clara, California, at 408/562-4200.—T. M.

## Discount Color

 Deneba Software is preparing UltraPaint, a paint package that the company claims can replace SuperPaint, PixelPaint, and ImageStudio—all for a mere \$199. UltraPaint will have five environments, including 8-bit (256) color paint; 8-bit gray scale; black-and-white paint; a basic draw environment; and a combination environment. UltraPaint documents will have eight layers, which can be assigned in any combination to the five environments.



Scott Brodrick, RasterOps product manager, with an image from one of the Professional Series of ColorBoards.




**Kid brother to Canvas:** UltraPaint has some object-oriented capabilities, but definitely leans toward a color bitmap package.

Among UltraPaint's features will be discontinuous lassos that you can add to or subtract from on the fly and save as reusable masks; chalk and charcoal tools; an eyedropper for picking up colors; and smudge and water-dropper tools for altering colors and grays. You will be

able to select and change colors singly or in a group, and then save and reuse your custom color palettes.

UltraPaint is designed as an open-architecture application, and Deneba is preparing a tool kit that will allow developers to write drop-in modules. Many of the tools that come with UltraPaint are drop-ins developed at Deneba, including the masks, autotrace, a three-color airbrush tool, and a tool for doing color blends that follow an object's shape.

UltraPaint will also have all the normal paint tools for functions such as flipping, skewing, inverting a selection, tracing edges, stretching, and distorting. The program will be able to rotate in 1-degree increments, will provide one- and two-point perspective, and will run on a 1MB Mac Plus in black and white.

UltraPaint will be available for \$50 to registered owners of Deneba's Canvas or Silicon Beach's SuperPaint. For further information, contact Deneba in Miami, Florida, at 305/594-6965.—D.L. 

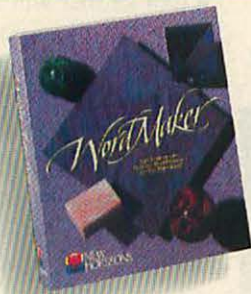


# In the far northern

**WILL IT WORK ON MY MAC????** Good question. You see, most Mac users are now working on machines that have 1 Meg of RAM and the 128K ROM chips (i.e. a Mac Plus, SE, or an earlier Mac that's been upgraded to that level). For that reason, a great deal of hardware and software requires at least that configuration. So, if you own an earlier Mac 128K or 512K you should *always* tell us, when placing your order. That way we can tell you right away if what you want is compatible. And, if it's not, we can explain to you the different options for upgrading.

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- 5861 CashLedger 1.3A ..... 119.



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**MultiLedger 1.3**—An integrated accounting solution combining G/L, A/R, A/P, and inventory tracking ..... \$239.  
**Payroll 4.02**—A payroll system for 1 to 1000 employees. All tax tables are included... 179.

- 5862 Payroll 4.02 ..... 179.
- 5863 MultiLedger 1.3 ..... 239.
- Computer Associates/Bedford**
- 4977 Simply Accounting 1.04 ..... 219.
- ★ **DacEasy Software ... 60 day MBG**
- 4502 DacEasy Light 1.0 ..... 42.
- ★ **Dow Jones ... 30 day MBG**
- 1786 Market Manager PLUS 2.0 ..... 189.
- ★ **Intuit ... 30 day MBG**
- 2425 Quicken 1.5 ..... 36.
- ★ **Layered ... 30 day MBG**
- 5207 atOnce! 1.0 ..... 289.
- 2609 Insight Expert A/P 2.02 ..... 399.
- 2610 Insight Expert A/R 2.2 ..... 399.
- 2611 Insight Expert G/L 2.1 ..... 399.
- 2612 Insight Expert Inventory 1.01 ..... 399.
- 5643 Insight Expert Payroll 1.0 ..... 399.
- 2614 Insight Expert Time Billing 2.01 ..... 399.
- ★ **MECA ... 60 day MBG**
- 2796 Managing Your Money 3.0 ..... 124.
- ★ **Monogram ... 30 day MBG**
- 2780 Dollars & Sense 5.0 ..... 81.
- 2779 Business Sense 1.2 ..... 269.
- ★ **Niles & Associates ... 30 day MBG**
- 5101 Grant Manager 1.75 ..... 249.
- ★ **Nolo Press ... 60 day MBG**
- 2981 WillMaker 3.0 ..... 32.
- ★ **North Edge Software ... 30 day MBG**
- 2986 Timeslips III 1.1 ..... 169.
- Pro Plus Software**
- 4310 Wall Street Investor 3.01 ..... 449.
- Satori**
- 3978 Components G/L ..... 369.
- 6109 Components A/R ..... 369.
- SoftView**
- 3470 MacInTax ..... 65.
- ★ **Survivor Software ... 30 day MBG**
- 6097 InvoicIt ..... 50.
- 3289 MacMoney 3.5 ..... 60.

## NUMBERS & DATABASES

- ★ **Abacus Concepts ... 30 day MBG**
- 4482 StatView SE + Graphics 1.03 ..... 199.
- 4481 StatView II 1.03 ..... 285.
- 5840 SuperANOVA 1.0 (for Mac Plus/SE) ..... 465.
- 5904 SuperANOVA 1.0 (for Mac II) ..... 465.
- 5906 SE + Graphics/SuperANOVA bundle ..... 595.

- 5907 StatView II/SuperANOVA bundle .. \$695.
- ★ **Acius ... 30 day MBG**
- 5618 4th Dimension 2.0 ..... 469.
- 4024 4th Dimension Runtime 2.0 ..... 229.
- Blyth Software**
- 5492 Omnis 5 ..... 349.
- 5855 Omnis 5 (Additional 1 user) ..... 75.
- ★ **BrainPower ... 60 day MBG**
- 1532 DataScan 1.03 ..... 109.
- 1535 DesignScope 1.15 ..... 119.
- 1534 MathView Professional 1.1 ..... 129.
- 1537 StatView 512+ 1.2 ..... 149.
- 3960 ArchiText 1.03 ..... special 159.
- 4066 The Analyzer Bundle (includes DataScan, DesignScope, and StatView 512+) ..... 299.
- ★ **Bravo Technologies ... 30 day MBG**
- 1539 MacCalc 1.2D ..... 79.
- 6084 MacCalc/SPAMM Bundle ..... 115.
- ★ **Chang Labs ... 60 day MBG**
- 1611 C.A.T. 2.0 ..... 229.
- Claris**
- 4196 FileMaker II 1.1V2 ..... 225.
- 5910 FileMaker II & MacWrite II Bundle ..... 299.
- 1125 MacProject II 2.0 ..... 375.
- ★ **Delta Point ... 60 day MBG**
- 6106 Trapeze ..... 99.
- ★ **Fox Software ... 30 day MBG**
- 5572 FoxBASE II/Mac 2.0 ..... 295.
- 4580 FoxBASE + /Mac Runtime 2.0 ..... 179.
- 4844 FoxBASE + /Multi-User 2.0 ..... 399.
- 5579 FoxBASE + /Multi-User Runtime ..... 295.
- Individual Software**
- 4720 101 Macros for Excel 1.5 ..... 35.
- Informix**
- 4955 Wingz 1.1 ..... 249.
- ★ **Microsoft ... 30 day MBG**
- 2866 File 2.0A ..... 125.
- 2884 Works 2.0 ..... 185.
- 2865 Excel 2.2 ..... 249.
- 5454 The Microsoft Office ..... 529.
- ★ **Nolo Press ... 60 day MBG**
- 4228 For the Record 1.03 ..... 28.
- ★ **Odesta ... 30 day MBG**
- 3014 GeoQuery 1.01 ..... 198.
- 4211 DataDesk Professional 2.0 ..... 285.
- 5621 Double Helix III 3.0 ..... 339.
- Paracomp**
- 4664 Milo 1.0 ..... 158.



**Practical Peripherals ... 30 day MBG**  
**Macintosh Communications Pack 1.5**—External 2400SA Modem, cable, and top-selling communications software. Hayes compatible, auto-answer. A superior value. .... \$225.



# town of Marlow,



## Nuvotech ... 60 day MBG

NuvoLink SC—Attaches to the SCSI port of any SCSI equipped Mac. Includes installation and management software, Apple's LAP manager, and Ethernet compatible driver. Runs on thick or thin Ethernet cabling or over twisted pair wire. \$369.

## ★Preferred Publishers ... 30 day MBG

4780 DAtabase 1.12 ..... 69.

## ★ProVUE ... 60 day MBG

4582 Panorama 1.1.1 ..... 199.

## ★Rubicon Publishing ... 60 day MBG

3272 Dinner At Eight-Encore Edition (CP) 45.

## Satori

3320 BulkMailer 3.25 ..... 78.

3321 BulkMailer Plus 3.25 ..... 189.

## ★Softstream Int'l., Inc. ... 60 day MBG

5439 Endeavour Planner 1.0 ..... 95.

## ★Synergy ... 30 day MBG

3129 KaleidaGraph 2.0 ..... 145.

## GRAPHICS & DESIGN

## ★Aegis Development ... 60 day MBG

4956 Showcase F/X 1.0 ..... 199.

## Altsys

1194 FONtastic Plus 2.02 ..... 51.

5425 Art Importer 2.0 ..... 92.

## Bright Star Technology

3962 HyperAnimator 1.5 ..... 99.

## Broderbund Software

4065 PosterMaker Plus 2.5B ..... 35.

1427 Print Shop 1.3 ..... 35.

## ★Casady & Greene ... 60 day MBG

1575 Fluent Fonts 2.0 ..... 27.

## Claris

1123 MacPaint II 2.0 ..... 95.

1117 MacDraw II 1.1 ..... 295.

5911 MacDraw II & MacWrite II Bundle ..... 369.

4815 Smart Form Designer 1.01V ..... 295.

4814 Claris CAD 1.0 ..... 595.

## Computer Associates/Cricket

1667 Cricket Draw 1.1.1 ..... special 139.

## ★DeltaPoint ... 60 day MBG

6095 DeltaGraph ..... 99.

## ★Deneba Software ... 30 day MBG

1769 Canvas 2.0 ..... 169.

## ★DreamMaker ... 30 day MBG

4088 MacGallery (MacPaint format) ... \$27.

## Dubi-Click Software

3972 World-Class Fonts! ..... each 42.

MacConnection carries the entire line

of WetPaint Clip-Art.

Volumes 1 & 2 thru 17 & 18 ... each 42.

## ★Electronic Arts ... 30 day MBG

5289 Studio/1 1.0 ..... 97.

4315 Studio/8 1.0 ..... 299.

## ★Emerald City ... 30 day MBG

5168 Smart Art I 1.0 ..... 85.

5602 Smart Art II 1.0 ..... 85.

5603 Smart Art III 1.0 ..... 85.

## ★Enabling Technologies ... 30 day MBG

1871 Pro3D 1.2 ..... 279.

Clip 3D (8 clip-art pkgs.) ..... each 57.

## Enzan-Hoshigumi USA

1879 MacCalligraphy 2.0 ..... 99.

## ★Foundation Publishing ... 60 day MBG

2385 Comic People ..... 21.

2384 Comic Strip Factory 1.6 ..... 38.

## ★Generic Software ... 60 day MBG

4319 Generic CADD Level 1 1.1 ..... 84.

## ★Good Software ... 30 day MBG

5428 NuPaint 1.0.4 ..... 79.

## ★Graphsoft ... 30 day MBG

4993 MiniCad+ 2.0V4 ..... 519.

## ★Great Wave ... 30 day MBG

2272 Crystal Paint 1.0 ..... special 25.

## Innovative Data Design

2417 MacDraft 1.2B ..... 143.

4707 Dreams 1.0 ..... 265.

## ★Linguist's Software ... 60 day MBG

Over 100 language fonts ..... call

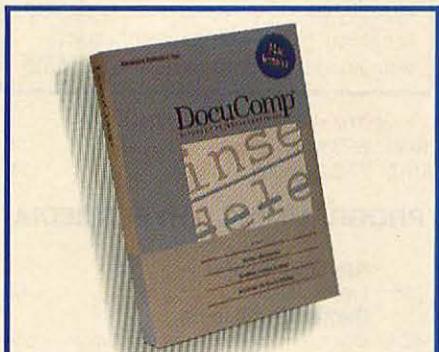
2630 Greek ..... 59.

2636 Kanji 6.0 ..... 59.

2641 LaserHebrew ..... 79.

## ★MacroMind ... 30 day MBG

4953 VideoWorks II 2.0 ..... 175.



## Advanced Software ... 30 day MBG

DocuComp 1.2—Finds and tracks changes in different versions of word processing files or source code. It saves untold hours of marking paper by hand. \$89.

4952 VideoWorks II HyperCard Driver 1.2 \$60.

4954 VideoWorks II Accel. 1.1 ... special 99.

6159 MacroMind Accelerator ..... 129.

5087 MacroMind Director 1.01 ..... 445.

## ★MicroMaps ... 30 day MBG

5516 MacAtlas (Paint version) ..... 45.

5514 MacAtlas (EPSF version) ..... 105.

5513 MacAtlas (Professional version) ..... 105.

5515 MacAtlas Presentation Pack ..... 105.

## Mindscape

5768 ZING 1.0 ..... 125.



## Software Innovations ... 30 day MBG

HandOff 1.1—Open any document from the Finder, even if its application is missing, by selecting any compatible substitute. Jean-Louis Gassée says it's, "a nice, unobtrusive and very much needed extension to my Macintosh." ... \$32.

## Paracomp

4597 Swivel 3D 1.1 ..... 299.

4011 ModelShop 1.0 ..... 378.

## ★Silicon Beach ... 60 day MBG

3504 Silicon Press 1.1 ..... 52.

3506 SuperPaint 2.0 ..... 125.

3980 Digital Darkroom 1.1 ..... 249.

3507 Super3D 2.0 ..... 315.

## ★Solutions Int'l. ... 60 day MBG

3446 The Curator 1.05 ..... 72.

## ★SuperMac Software ... 60 day MBG

3380 PixelPaint 2.0 ..... 225.

5625 PixelPaint Professional 1.0 ..... 395.

## ★T/Maker ... 30 day MBG

3632 ClickArt Business Images ..... 28.

3636 ClickArt Holidays ..... 28.

3633 ClickArt Christian Images ..... 35.

## 3G Graphics

3942 Images with Impact: Graphics 1 ... 51.

4583 Images with Impact: Business 1 ... 65.

## ★Zedcor ... 60 day MBG

3986 DeskPaint & DeskDraw 2.01 ..... 65.

## PUBLISHING & PRESENTATIONS

## Adobe Systems

5750 Adobe Type Manager ..... 56.

6053 Adobe Plus Pack ..... 109.

6156 Adobe ATM/Plus Pack Bundle ..... 162.



# we're not slowed down



## Somak Software ... 30 day MBG

ScriptEdit 1.1—Now novice and experienced HyperCard users can create and edit scripts faster and easier than ever, with multiple script windows, global search and replace, HyperTalk pop-up menus and more. \$49.

1138	The Collector's Edition	79.
4816	The Collector's Edition II	129.
5001	StreamLine 1.0	229.
5605	True Form 2.0	225.
5606	True Form FillOut 2.0	169.
1137	Adobe Illustrator '88 1.9	279.
1142	Newsletters/Publishing Pack 1	229.
4565	Forms and Schedules Pack 2	279.
4566	Presentations Pack 3	279.
MacConnection carries the entire Adobe Type Library.		
Volumes 1-122		call

## ★Aldus ... 30 day MBG

4751	Persuasion 2.0	339.
1330	Freehand 2.02	339.
1331	PageMaker 3.02	385.
6149	PageMaker Color Extension	135.

## Altsys

1195	Fontographer 3.0	249.
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## ★Antic Software ... 30 day MBG

5756	FlexForm Business Templates I	49.
5760	FlexForm Business Templates II	49.

## Bitstream

MacFontware Typeface pkgs... ea. 89.

## Bright Star Technology

6093	Interface 1.0	229.
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## ★Casady & Greene ... 60 day MBG

MacConnection carries the entire line of Casady & Greene fonts.

Volumes 1-22		each 46.
4838	Quill Pack (Vol. 8 & 20)	89.
4836	Headline Pack (Vol. 10-12)	125.
4837	Modern Pack (Vol. 7, 14-18)	159.
4834	Distinctive Pack (Vol. 8, 19-22)	159.
4833	Classic Pack (Vol. 3-6, & 13)	159.

## Computer Associates/Cricket

1668	Cricket Graph 1.3	115.
1670	Cricket Presents 2.0	285.

## ★DreamMaker ... 30 day MBG

4840	Cliptures: Business 1	69.
4841	Cliptures: Business 2	69.

## Dubl-Click Software

World-Class LaserType Vol. 1-9 each 42.

## ★Emerald City ... 30 day MBG

6098	TypeAlign for ATM 1.0	63.
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## ★Farallon Computing ... 30 day MBG

4684	ScreenRecorder 1.0	129.
2199	MacRecorder 2.0	162.

## ICOM Simulations

5682	Mackern 1.0	\$115.
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## Letraset

2621	Ready, Set, Go! 4.5	275.
2619	Image Studio 1.5	275.
4709	LetraStudio 1.0	275.

## ★Microsoft ... 30 day MBG

2878	PowerPoint 2.01	249.
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## ★Preferred Publishers ... 30 day MBG

5751	Exposure 1.1	54.
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## Quark

4621	QuarkStyle 1.0	169.
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3230	Quark XPress 2.11	459.
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## ★Softstream Int'l., Inc. ... 60 day MBG

4996	UltraSpec 1.0	95.
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## ★Springboard ... 30 day MBG

3530	Certificate Maker 2.0	22.
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3532	Certificate Library	18.
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4497	Top Honors 1.01	59.
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4500	Springboard Publisher II	109.
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## ★Timeworks ... 30 day MBG

5908	Publish-it! 1.0	225.
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## TheComplete PC

TheComplete Half-Page Scanner/400—A versatile personal scanner for desktop publishing. Scan at up to 400 dpi and then resize, scale, rotate, crop or edit your picture with the SmartScan software included. Compact and easy to use \$315.

## ★T/Maker ... 30 day MBG

3635	EPS Illustrations	74.
5167	EPS Business Art	74.

## PROGRAMMING & HYPERMEDIA

### Apple Computer

1118	HyperCard 1.2.2	42.
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### Bantam Publishing

1403	Complete HyperCard Handbook	22.
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## ★Antic Software ... 30 day MBG

6100	HOT-SPOT	42.
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## ★Beacon Technology ... 30 day MBG

4967	HyperBible (King James) 1.0	145.
4968	HyperBible (New International) 1.0	175.

### Borland International

1511	Turbo Pascal 1.1	68.
1512	Turbo Pascal Tutor 1.0	46.

### Broderbund Software

5237	Whole Earth Catalog (CD ROM)	89.
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## ★Digitalt ... 60 day MBG

5166	SmallTalk/V Mac 1.1	125.
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## ★DreamMaker ... 30 day MBG

4115	MacGallery (HyperCard format)	27.
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## ★Emerald City ... 30 day MBG

5728	LaserTalk 1.0	149.
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## Hyperpress Publishing

5435	HyperOne 1.0	\$29.
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4233	Icon Factory 1.0	29.
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5089	Script Library 1.0	29.
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4265	Script Expert 1.0	45.
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5434	Intelligent Developer 1.0	219.
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## ICOM Simulations

5681	HyperTMON 1.0	59.
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4085	TMON 2.8.2	89.
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## Individual Software

4719	101 Scripts & Buttons HyperCard 1.0	36.
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## ★Manx Software ... 60 day MBG

4068	Aztec C 3.6B	63.
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4317	Aztec SDB	63.
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4316	Aztec C UniTools	63.
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4069	Aztec MPW C 3.6B	95.
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4075	Aztec C + SDB 3.6B	95.
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## ★MicroMaps ... 30 day MBG

5512	HyperAtlas	59.
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5518	QuickMap	59.
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## ★Microsoft ... 30 day MBG

4471	QuickBasic 1.0	65.
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## ★Millenium Software ... 30 day MBG

6105	Hyper X 3.0	65.
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### Olduvai

5446	PLUS 1.11	109.
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## ★Silicon Beach ... 60 day MBG

5100	SuperCard 1.0	125.
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## ★SmethersBarnes ... 30 day MBG

1478	Prototyper 2.1	189.
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## ★Softstream Int'l., Inc. ... 60 day MBG

5440	HyperHIT 1.0	125.
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## ★Somak Software ... 30 day MBG

5897	ScriptEdit 1.1	49.
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## ★Springboard ... 30 day MBG

4495	Family Matters 1.0	28.
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## ★Symantec ... 30 day MBG

4644	Just Enough Pascal 1.0	47.
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3421	THINK Pascal 2.0	89.
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3420	THINK C 4.0	149.
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## ★Symmetry ... 30 day MBG

3318	HyperDA 1.2	49.
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## ★Timeworks ... 30 day MBG

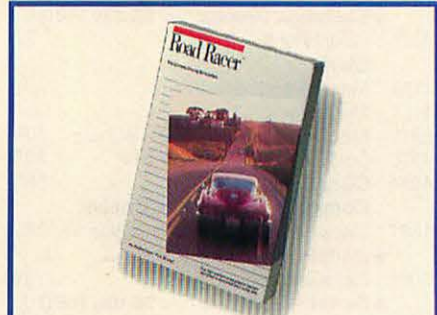
5905	The Hyperworks Organizer 1.0	57.
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## ★TML Systems ... 30 day MBG

3548	TML Source Code Library II 1.1	39.
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4989	TML Pascal II 3.0 (w/o MPW 3.0)	57.
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3549	TML Pascal II 3.0 (w/MPW 3.0)	109.
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## XOR ... 30 day MBG

Road Racer—Drive your high-performance 1965 Corvette through 5 environments (3 levels of difficulty in each) ranging from high-speed desert flats to twisting mountain roads. Uses digitized sounds and graphics. \$38.

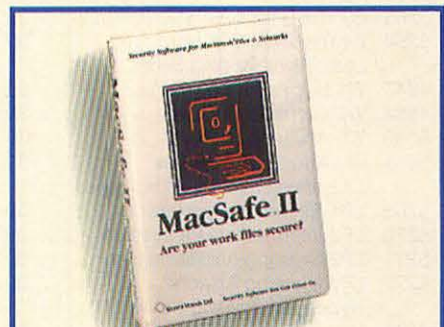


# by huge drifts of snow.

<b>Trendware</b>		
5203	Stack Cleaner	\$29.
5202	HyperTools #1 1.02.	52.
5199	HyperTools #2 1.04.	52.
5609	XCAL 1.0	77.
<b>True BASIC, Inc.</b>		
3587	True BASIC 2.01	55.
<b>★Zedcor ... 60 day MBG</b>		
3985	ZBASIC 5.0.	89.

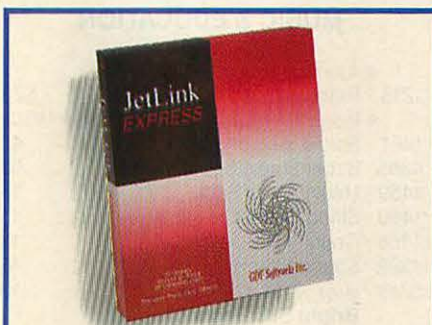
## UTILITIES

<b>★Abbott Systems ... 30 day MBG</b>		
5236	CanOpener 1.1	65.
<b>★Affinity Microsystems ... 60 day MBG</b>		
1014	Affinifile 1.1.	45.
1016	Tempo II 1.02	75.
<b>★Aladdin Systems ... 30 day MBG</b>		
6169	Shortcut 1.0.1.	46.
<b>★American Power ... 30 day MBG</b>		
6102	PowerChute	65.
<b>★Berkeley Systems ... 30 day MBG</b>		
5737	After Dark 1.0.	25.
1541	Stepping Out II 2.01	50.
<b>Borland</b>		
1510	Sidekick 2.0	68.
<b>★Bravo ... 30 day MBG</b>		
5404	SPAMM 1.1	48.



**Kent Marsh Ltd. ... 30 day MBG**  
*MacSafe II*—Advanced password protection for files and applications, using folder-like safes. Control Panel access, blindingly-fast encryption, override capability, move groups of files by "Project Sets." Great for networks and shared Macs . . . . \$107.

<b>★Casady &amp; Greene ... 60 day MBG</b>		
2269	QuickDEX 1.4A	31.
<b>★CE Software ... 60 day MBG</b>		
4689	MockPackage Plus Utilities 4.4	32.
1727	CalendarMaker 3.0.	32.
1728	DiskTop 4.0.	64.
1729	QuickKeys 1.2	64.
<b>★Central Point ... 30 day MBG</b>		
5040	Copy II Mac 7.2	24.
5041	PC Tools Deluxe Mac 1.1	45.
<b>Connectix</b>		
6123	Virtual 2.0 (for SE/30, IIcx, IIx, & IIci)	125.



**GDT Softworks ... 30 day MBG**  
*JetLink Express 1.02*—ATM compatible printer driver for the HP Deskjet, Laserjet, and HP compatible printers. Features include enlargement, reduction, font substitution and more. Includes serial cable and 13 outline fonts \$89.

6122	Virtual 2.0 (for Mac II, incl. PMMU)	195.
<b>★Dantz Development ... 30 day MBG</b>		
5255	Retrospect 1.1	152.
<b>Dubi-Click Software</b>		
1824	Calculator Construction Set 2.01	46.
<b>★Electronic Arts ... 30 day MBG</b>		
1843	Disk Tools Plus 1.01 (Batteries Incl.)	31.
<b>★Fifth Generation ... 60 day MBG</b>		
4287	PYRO! 3.3 (screen saver)	14.
3954	PowerStation 2.5.	34.
3955	Suitcase II 1.2.3	44.
5178	FastBack II 2.0	107.
5725	DiskLock 1.0.	108.
<b>★HJC Software ... 30 day MBG</b>		
4803	Virex 2.1	55.
5885	Virex 2.1 (10 Pack)	349.
<b>ICOM Simulations</b>		
4084	On Cue 1.3.	35.
<b>★Insight Development ... 30 day MBG</b>		
6171	MacPrint.	95.
<b>★JAM Software ... 30 day MBG</b>		
6089	Smart Alarms Single User	49.
6088	Smart Alarms 1-4 Users	99.
6087	Smart Alarms 5-8 Users	149.
6086	Smart Alarms 9-15 Users	199.
6085	Smart Alarms 16-25 Users	299.
<b>★Kent Marsh Ltd. ... 30 day MBG</b>		
5457	QuickLock 1.0	57.
2591	The NightWatch 1.03	87.
6134	MacSafe II.	107.
<b>★Kiwi Software ... 60 day MBG</b>		
6267	Kiwi Envelopes!	35.
<b>★Loop Software ... 30 day MBG</b>		
5442	PictureBook 3.1	39.
<b>MEDIAGENIC</b>		
4591	Open It! 1.0	49.
<b>★Microlytics ... 60 day MBG</b>		
2732	GOfer 2.0	45.
<b>★Microseeds Pub. ... 60 day MBG</b>		
4848	INITPicker 1.0.	27.

4210	Screen Gems 1.0	\$39.
2913	Redux 1.5.	51.
<b>Olduvai</b>		
4503	MultiClip 1.01	50.
<b>★Software Innovations ... 30 day MBG</b>		
5869	HandOff 1.1	32.
<b>★Solutions Int'l. ... 60 day MBG</b>		
3448	SmartScrap & The Clipper 2.1	45.
3449	SuperGlue II 2.0	61.
<b>★SuperMac Software ... 60 day MBG</b>		
3383	SuperSpool 5.0	58.
3382	SuperLaserSpool 2.0	87.
3378	SuperLaserSpool 5-Pack 2.0	295.
3377	DiskFit 1.5	58.
3379	Network DiskFit 1.5.	225.
3381	Sentinel 2.0	87.
<b>★Symantec ... 30 day MBG</b>		
5176	Symantec Anti-virus for Mac 1.1	63.
5724	Symantec Utilities II for Mac	94.
<b>★Synex ... 30 day MBG</b>		
6173	MacEnvelope 4.1	79.
<b>★Williams &amp; Macias ... 30 day MBG</b>		
3779	DiskFinder	27.
3783	myDiskLabeler w/Color 2.9.11.	28.
3784	myDiskLabeler w/LaserWriter 2.9.11.	33.
3780	ImageWriter II Label Pack (Qty. 216)	15.
3781	LaserWriter Label Pack (Qty. 216)	18.
4976	Sticky Business 1.0.7	89.
<b>★XTree ... 30 day MBG</b>		
5177	XTreeMac 1.02	52.

## WORD PROCESSING

### A Lasting Impression

5465	ResumExpert	39.
5749	Cover Letters	39.
5853	Sales & Marketing	39.
5852	Management Edition	39.
<b>★Advanced Software ... 30 day MBG</b>		
5608	DocuComp 1.11	89.



**Software Ventures ... 30 day MBG**  
*MicroPhone II 3.0*—New version of top-selling telecom software. Build graphic front-ends to remote services & corporate mainframes. Supports XCMDs & XFCNs, ZMODEM, icons, European languages, color & sound . . . . \$219.

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## Freesoft ... 60 day MBG

**White Knight 1.1**—(Formerly Red Ryder) supports XMODEM, YMODEM, ZMODEM, Kermit, and CompuServe Error Correcting protocols. Includes Okyto 1.0, a Mac-to-Mac file transfer program, and a free subscription to GEnie. \$89.

## Ashton-Tate

1324 FullWrite 1.1 ..... 259.

## Claris

1129 MacWrite II 1.0 ..... 179.

## ★DeltaPoint ... 60 day MBG

6108 MindWrite 2.1 ..... 59.

6107 MindWriteExpress 2.1 ..... 79.

## ★Deneba Software ... 30 day MBG

4700 BigThesaurus 1.0 ..... 59.

1767 Comment 2.0 ..... 59.

1768 Coach Professional 3.0C ..... 115.

## ★Electronic Arts ... 30 day MBG

1543 Thunder II 1.01 (Batteries Included) 49.

## ★Lundeen & Assoc. ... 60 day MBG

2684 WorksPlus Spell 2.0A ..... 56.

## ★Microlytics ... 60 day MBG

2733 Word Finder 2.0 ..... 34.

4870 Electronic WordFinder 220 ..... 69.

## ★Microsoft ... 30 day MBG

2885 Write 1.0 ..... 79.

4969 Word 4.0 ..... 249.

## ★New Horizons ... 30 day MBG

6262 WordMaker 1.0.1 ..... 65.

## ★Niles & Associates ... 30 day MBG

5048 EndLink 1.0 ..... 58.

4602 EndNote 1.2.1 ..... 75.

## ★Paragon Concepts ... 30 day MBG

5683 Nisus 2.03 ..... 249.

## ★Preferred Publishers ... 30 day MBG

4781 Vantage 1.1 ..... 54.

## ★Reference Software ... 30 day MBG

6268 Grammatik Mac 1.0 ..... 52.

## ★Sensible Software ... 30 day MBG

3375 Sensible Grammar 1.5.5 ..... 53.

4692 Bookends 1.1.7 ..... 53.

## ★Symantec ... 30 day MBG

3422 More II 2.01 ..... 245.

## ★Symmetry ... 30 day MBG

4504 Acta Advantage 1.0 ..... 65.

## ★T/Maker ... 30 day MBG

3639 WriteNow 2.0 ..... 109.

## ★WordPerfect ... 60 day MBG

3800 WordPerfect Mac 1.0.2 ..... 185.

## ★Working Software ... 30 day MBG

3790 Lookup 1.0C ..... 30.

3788 Findswell 2.0 ..... 36.

3792 Spellswell 2.0G ..... 45.

4699 QuickLetter 1.01 ..... 73.

## MUSIC & EDUCATION

### ★Ars Nova ... 30 day MBG

1215 Practica Musica 2.2 ..... \$72.

### ★Bogas Productions ... 60 day MBG

1461 Studio Session 1.2 SE ..... 45.

4255 Super Studio Session 2.0 ..... 65.

1459 Heavy Metal Rock ..... 13.

1460 String Quartet ..... 13.

1458 Country Disk ..... 13.

4832 Sound Effects ..... 13.

5719 Brass Disk ..... 13.

### Bright Star Technology

3961 Talking Tiles 1.0 ..... 27.

1402 Alphabet Blocks 1.0 ..... 30.

### Broderbund Software

4314 Type! 1.0 ..... 18.

1423 Jam Session 1.1 (CP) ..... 29.

1422 Geometry 1.2 (CP) ..... 58.

4067 Calculus 1.2 (CP) ..... 58.

1426 Physics 1.2 (CP) ..... 58.



## Penton Overseas ... 30 day MBG

**VocabuLearn/ce**—Dynamic foreign language programs. Interactive HyperCard Stack available in five languages and two levels. Two 90 min. audio cassettes, word list and HyperCard 1.2. Perfect bilingual aid. .... see line listing

### Carina Software

5726 Voyager 1.2 ..... 89.

### Coda Music Systems

4367 MacDrums 1.01 (CP) ..... 31.

4483 Perceive 1.0 ..... 49.

5854 MusicProse 1.0 ..... 169.

### Davidson & Associates

1734 Math Blaster! 1.0 (CP) ..... 26.

6128 Math Blaster Mystery (CP) ..... 26.

4978 Speed Reader II 1.0 (CP) ..... 26.

### ★Electronic Arts ... 30 day MBG

4619 Mavis Beacon Typing 1.2B (CP) ..... 32.

1846 Deluxe Music Construction Set 2.5 ..... 84.

### ★First Byte ... 30 day MBG

5294 Puzzle Storybook 1.0 (ages 3-8) ..... 27.

5293 Dinosaur Discovery Kit 1.0 (ages 3-8) ..... 27.

3941 SmoothTalker 2.1 ..... 32.

3936 KidTalk 2.0 (ages 5-15) ..... 32.

3940 First Shape 2.0 (ages 3-8) ..... 32.

3935 Speller Bee 2.0 (ages 5-12) ..... 32.

### ★Great Wave ... 30 day MBG

2277 TimeMasters 1.0 (ages 4 +) ..... 22.

2276 KidsTime 1.2 (ages 3-8) ..... 26.

5642 KidsMath 1.1 (ages 3-8) ..... 26.

4334 NumberMaze 1.1 (ages 5-12) ..... 26.

2270 American Discovery 2.3 (ages 9 +) ..... 26.

2273 ConcertWare + 4.0 ..... \$38.

2271 ConcertWare + MIDI 5.0 ..... 99.

### ★Learning Company ... 30 day MBG

2670 Reader Rabbit 2.1 (CP) (ages 4-7) ..... 31.

5453 Talking Math Rabbit 1.0 (ages 4-7) ..... 31.

### ★Paragon Concepts ... 30 day MBG

6094 MacTag 2.04 ..... 42.

### ★Penton Overseas ... 30 day MBG

5864 VocabuLearn/ce French (level 1) ..... 30.

5887 VocabuLearn/ce French (level 2) ..... 30.

5865 VocabuLearn/ce Italian (level 1) ..... 30.

5889 VocabuLearn/ce Italian (level 2) ..... 30.

5867 VocabuLearn/ce Spanish (level 1) ..... 30.

5891 VocabuLearn/ce Spanish (level 2) ..... 30.

5868 VocabuLearn/ce German (level 1) ..... 30.

5888 VocabuLearn/ce German (level 2) ..... 30.

5866 VocabuLearn/ce Japanese (level 1) ..... 36.

5890 VocabuLearn/ce Japanese (level 2) ..... 36.

### ★Personal Training Sys. ... 60 day MBG

#### Excelerate 2.2 Training Series

5573 XL1 Beginning Spreadsheets ..... 39.

5574 XL2 Intermediate Spreadsheets ..... 39.

5575 XL3 Advanced Spreadsheets ..... 39.

5576 XL4 Creating Business Graphics ..... 39.

6021 XL5 Building Databases ..... 39.

6020 XL6 Beginning Micros ..... 39.

#### MacTeach Training Series

5263 B1 The Basics (for 2 floppy drives) ..... 39.

5264 B2 The Basics (for Plus or SE w/HD) ..... 39.

5265 B3 The Basics (for Mac II w/HD) ..... 39.

5266 B4 Beyond the Basics ..... 39.

#### LearnWord Training Series

4947 W1 Beginning Level ..... 39.

4854 W2 Intermediate Level ..... 39.

5098 W3 Advanced Level ..... 39.

5418 W4 Additional Features ..... 39.

#### LearnPersuasion Training Series

5269 LP1 Beginning Persuasion ..... 39.

5270 LP2 Intermediate Persuasion ..... 39.

5271 LP3 Creating AutoTemplates ..... 39.

5272 LP4 Creating Artwork ..... 39.

#### HyperEasy Training Series

5194 H1 Using HyperCard ..... 39.

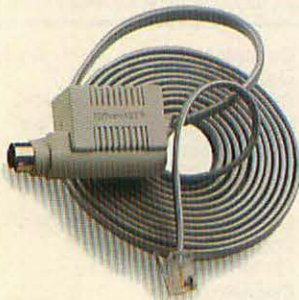
5195 H2 Creating Cards & Stacks ..... 39.

5267 H3 Basic Scripting ..... 39.

5268 H4 Advanced Scripting ..... 39.

#### PageTutor Training Series

4852 P1 Beginning PageMaker ..... 39.

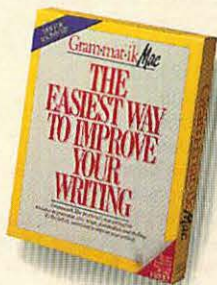


## Farallon Computing ... 30 day MBG

**PhoneNET StarConnectors**—Less than half the size of standard PhoneNET Connectors, and ideally suited for star topology networks \$21.  
PhoneNET StarConnector 10/Pack ..... 139.



# you won't have to wait,



**Reference Software ... 30 day MBG**  
Grammatik Mac 1.0—New! Powerful writing help. Checks for grammar, style, usage, punctuation and spelling errors in one pass. Detects over 10,000 writing errors and gives you instant, complete advice ... \$52.

- 4853 P2 Intermediate PageMaker ... 39.
- 5096 P3 Tips & Techniques ... 39.
- 5097 P4 Advanced Features ... 39.
- MasterWorks Training Series*
- 5196 M1 Database & Form Letters ... 39.
- 5197 M2 Advanced Databases ... 39.
- 5273 M3 Spreadsheets ... 39.
- 5274 M4 Word Processing ... 39.
- Learn88 Training Series*
- 5259 A1 Beginning Illustrator ... 39.
- 5260 A2 Intermediate Illustrator ... 39.
- 5261 A3 Creating Special Effects ... 39.
- 5262 A4 Precision Drawing Techniques ... 39.
- Learn FileMaker Training Series*
- 5278 FM1 Beginning FileMaker ... 39.
- 5279 FM2 Intermediate FileMaker ... 39.
- 5280 FM3 Advanced FileMaker ... 39.
- 5281 FM4 Tips & Techniques ... 39.
- ★Spinnaker ... 30 day MBG**
- 2329 SAT Score Improvement 1.0 (CP) ... 57.
- ★Springboard ... 30 day MBG**
- 4493 Atlas Explorer (CP) ... 28.
- ★Think Educational ... 60 day MBG**
- 3615 MacEdge II 1.0 (CP) (ages 6-12) ... 27.
- 3616 Mind Over Mac 1.4 (CP) ... 27.
- True BASIC, Inc.**
- 3571 Algebra (with workbook) ... 39.
- 3580 Pre-Calculus (with workbook) ... 39.
- 3575 Calculus (with workbook) ... 39.
- 6110 Algebraic Proposer ... 45.
- ★Unicorn ... 30 day MBG**
- 3751 Animal Kingdom (CP) (ages 6-12) ... 27.
- 3756 Math Wizard (CP) (ages 5-10) ... 27.
- 3755 MacRobots (CP) (ages up to 6) ... 27.
- 3754 Read-A-Rama (CP) (ages 5-8) ... 32.

## ENTERTAINMENT

### Access Software

- 4655 World Class Leader Board Golf ... 26.

### Accolade

- 1184 Hardball (CP) ... \$29.
- 4484 Mean 18 (CP) ... 29.
- 4485 4th and Inches (CP) ... 29.
- Activision**
- 4475 Quarterstaff (CP) ... 29.
- 4486 Manhole ... 29.
- 5127 Manhole (CD ROM) ... 35.
- 5517 Cosmic Osmo ... 42.

### Broderbund Software

- 5886 Star Wars (CP) ... 24.
- 4099 Shufflepuck Cafe (CP) ... 24.
- 1421 Ancient Art of War (CP) ... 26.
- 4540 Ancient Art of War at Sea (CP) ... 26.
- 4229 Where/World Carmen Sandiego? (CP) ... 27.
- 5755 Where/Europe Carmen Sandiego? (CP) ... 29.
- 5233 Where/USA Carmen Sandiego? (CP) ... 29.
- 4966 SimCity 1.1 (CP) ... 29.
- 5871 SimCity Supreme (CP) ... 48.

### ★Bull City Software ... 30 day MBG

- 5841 Moriarty's Revenge ... 32.

### Bullseye

- 1545 Fokker Triplane 2.02 (CP) ... 24.
- 1544 Ferrari Grand Prix (CP) ... 32.
- 4074 P51 Mustang Flight Simulator (CP) ... 32.

### ★Casady & Greene ... 60 day MBG

- 2268 Crystal Quest 2.2T ... 25.
- 4119 Crystal Quest w/Critter Editor 2.2T ... 41.

### ★Discovery Software ... 30 day MBG

- 4408 Arkanoid ... 26.

### ★Electronic Arts ... 30 day MBG

- 1850 Reach for the Stars ... 26.
- 5554 Bard's Tale ... 32.
- 4064 Chuck Yeager Flight Simulator ... 32.
- 4588 Life & Death (CP) ... 32.
- 4945 The Hunt for Red October ... 32.
- 4981 Starfleet 1 ... 36.

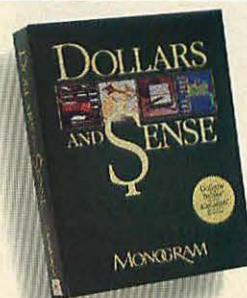
### Infocom

- 5814 Journey ... 29.
- 5816 Shogun ... 35.



**Softstream International ... 60 day MBG**  
22nd Street WHIST Tutor—Straight forward rules and a challenging game ... \$32.  
MacRummy Tutor—Play one of two classic games: straight Rummy or Gin Rummy. Score hand by hand or against the computer ... 32.

- 4592 Zork Zero (CP) ... \$35.
- 5815 Zork Zero (for the Mac II) ... 35.
- ★Inline Design ... 30 day MBG**
- 5870 Bomber (includes headphones) ... 26.
- MicroProse**
- 4697 Pirates! (CP) ... 35.
- ★Microsoft ... 30 day MBG**
- 2868 Flight Simulator (CP) ... 33.



### Monogram ... 30 day MBG

Dollars & Sense 5.0—This new version makes it even easier to take charge of your personal or small business finances. Checking, budgeting, expense tracking and custom reports are done for you—quickly and painlessly ... \$81.

### Miles Computing

- 5253 The Puzzle Gallery ... 27.
- 2765 Fool's Errand ... 32.
- 2767 Harrier Strike Mission II (CP) ... 32.

### Mindscape

- 4083 Balance of Power 1990 (CP) ... 29.
- 3987 Colony (CP) ... 29.
- 4596 Deja Vu II (CP) ... 29.
- 2743 Crossword Magic (CP) ... 29.
- 2749 Shadowgate (CP) ... 29.
- 5252 Gauntlet (CP) ... 29.
- 2751 Uninvited (CP) ... 29.

### Premier Technology

- 5773 Strategic Conquest Plus 2.0 ... 34.
- 5774 NetTrek-The Real Version ... 34.

### Sierra On-Line

- 4161 Mother Goose (CP) ... 19.
- 3397 Leisure Suit Larry (CP) ... 23.
- 5694 Manhunter: San Francisco (CP) ... 29.
- 3394 King's Quest (CP) ... 29.
- 3395 King's Quest II (CP) ... 29.
- 3396 King's Quest III (CP) ... 29.
- 3398 Police Quest (CP) ... 29.
- 3399 Space Quest (CP) ... 29.
- 3400 Space Quest II (CP) ... 29.

### ★Silicon Beach ... 60 day MBG

- 3502 Beyond Dark Castle ... special 24.
- 3501 Apache Strike ... special 24.
- 3503 Dark Castle ... special 24.

### ★Softstream Int'l., Inc. ... 60 day MBG

- 4071 Mac•Man ... 23.
- 4072 The Solitaire DA ... 23.



# MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791



# 'cause we'll ship it



## Softview

**MacInTax 1989**—A sophisticated income tax preparation program that allows you to organize, store and print out tax information. Includes 74 IRS forms and schedules. . . . \$65.

4995	Cribbage Tutor	26.
6259	22nd Street WHIST Tutor	32.
6258	MacRummy Tutor	32.
4073	Colour Billiards	38.
<b>★Software Toolworks ... 30 day MBG</b>		
1842	Chessmaster 2100 (CP)	32.
6111	Cribbage King-Gin King	39.
<b>★Spectrum Holobyte ... 30 day MBG</b>		
4175	Solitaire Royale (for Mac SE)	19.
4001	Solitaire Royale (for Mac II)	19.
6112	Welltris	19.
3464	Tetris	19.
4472	Tetris (color version)	22.
3462	PT-109	26.
3460	GATO	26.
3459	Falcon 2.0	31.
<b>★Spinnaker ... 30 day MBG</b>		
2328	Sargon IV (CP)	29.
<b>★Springboard ... 30 day MBG</b>		
4988	Hidden Agenda	36.
<b>★SubLogic ... 60 day MBG</b>		
4698	Jet (CP)	32.
<b>★XOR ... 30 day MBG</b>		
6152	TaskMaker (CP)	27.
4321	Lunar Rescue (CP)	34.
4517	Road Racer (CP)	38.
4320	MacGolf Classic (CP)	53.
3815	NFL Challenge (CP)	57.

## NETWORKS & COMMUNICATIONS

<b>★Abaton ... 30 day MBG</b>		
4589	InterFAX 12/48 Modem	265.
6266	InterFAX 24/96 Modem	425.
<b>★CE Software ... 60 day MBG</b>		
5817	QuickMail Remote	33.
5174	QuickMail (5 user Pak)	169.
5173	QuickMail (10 user Pak)	249.
5636	In/Out (5 user Pak)	129.
5638	In/Out (10 user Pak)	189.
<b>★CompuServe ... 60 day MBG</b>		
1676	CompuServe Information Service	24.
1673	CompuServe Navigator 2.1	39.
1674	Standard Service/Navigator Bundle	59.
<b>Connect, Inc.</b>		
5834	Connect 1.5 for the Macintosh	95.
<b>★Dove Computer ... 60 day MBG</b>		
4939	FastNet III	375.

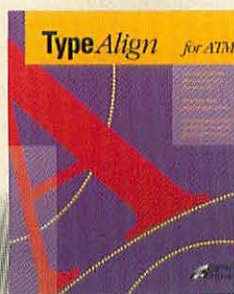
4938	FastNet SE	\$375.
5624	FastNet SE/30	375.
4937	FastNet SCSI	749.

### ★Dow Jones ... 30 day MBG

5295	News/Retrieval Membership Package	24.
1785	Desktop Express 1.03	95.

### ★Farallon Computing ... 30 day MBG

5707	Timbuktu 3.0	95.
4866	Timbuktu Remote 1.0.1	129.
4867	Timbuktu 30-Pack 3.0	1295.
2201	TrafficWatch 1.08	129.
2202	PhoneNET to LocalTalk Adapter	8.
5664	PhoneNET StarConnector	21.
6273	PhoneNET StarConnector 10-Pack	139.
2203	PhoneNET PLUS (DIN-8)	33.
2204	PhoneNET PLUS (DB-9)	33.
5251	PhoneNET CheckNET	64.
4869	PhoneNET Connector 10-Pack	215.
4868	PhoneNET Repeater	319.
2206	PhoneNET StarController	829.
2205	Star Wiring Kit (Punchdown)	65.
5455	Star Wiring Kit (Harmonica)	65.
5893	Portable Pack (incl. two copies each of Timbuktu & Timbuktu Remote, two StarConnectors, and accessories)	375.



### Emerald City ... 30 day MBG

**TypeAlign for ATM**—Exclusively for Adobe Type Manager owners, this gives type a change of face. Convenient desk accessory. Compatible with all major applications. . . . \$63.

### ★Freesoft ... 60 day MBG

6115	White Knight 11	89.
<b>Hayes</b>		
2300	Smartcom II 3.1A	87.
2307	Smartmodem 2400	429.
5991	V9600 Baud Modem	759.

### Insignia Solutions

4089	SoftPC 1.3	245.
<b>Intel Corporation</b>		
5119	2400EX Modem	179.
6265	2400EX with MicroPhone 1.5	245.

### ★Microsoft ... 30 day MBG

5858	Microsoft Mail 2.0 Workstation	84.
5856	Microsoft Mail 2.0 Server	249.
5857	Microsoft Mail 2.0 (20 Pack)	969.

### ★Nuvotech ... 60 day MBG

3000	TurboNet ST (DIN-8)	30.
3001	TurboNet ST (DB-9)	30.
5277	TurboBridge	319.
6272	NuvoLink SC	369.
6261	TurboStar	1449.

### ★Practical Peripherals ... 30 day MBG

3100	1200 Baud External Modem	77.
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3102	2400 Baud External Modem	\$179.
5285	PM 2400SA MNP Modem	209.
3089	Mac Communications Pack 1.5	225.

### ★Shiva ... 30 day MBG

3444	NetSerial X232	279.
4347	NetBridge	339.
4942	TeleBridge	339.
3443	NetModem V2400	439.

### ★Software Ventures ... 30 day MBG

3455	MicroPhone II 3.0	219.
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### ★Solutions Int'l. ... 60 day MBG

4308	BackFAX (reqs. Apple FAX modem)	124.
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### ★Synergy ... 30 day MBG

3130	VersaTerm 4.0	89.
3131	VersaTerm-PRO 3.0	175.

### ★TOPS ... 30 day MBG

4188	TOPS Teleconnector (DIN-8)	29.
4189	TOPS Teleconnector (DB-9)	29.
3726	TOPS for DOS 2.1	122.
4598	TOPS FlashBox	122.
3725	TOPS Repeater	122.
3720	TOPS Flashcard	155.
3723	TOPS Mac 2.1	159.
3724	NetPrint 2.0	122.
4714	InBox Starter Kit 2.2	145.
4715	InBox Connection Mac 2.2	42.
6264	Network Bundle 3.0	195.

### ★Traveling Software ... 60 day MBG

3729	LAP-LINK Mac 2.0	81.
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## INPUT/OUTPUT

### ★American Power ... 30 day MBG

5895	110SE UPS	269.
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### Caere

4476	OmniPage 2.0	549.
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### ★CoStar ... 30 day MBG

6067	LabelWriter Labels	11.
6090	LabelWriter	189.

### ★Cutting Edge ... 30 day MBG

3988	CE 105ADB Keyboard w/QuickKeys	135.
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### ★Datadesk ... 30 day MBG

1818	HyperDialer	29.
1819	MAC-101 Keyboard (beige)	139.
1820	MAC-101 Keyboard (platinum)	139.
1821	MAC-101 Keyboard (ADB)	139.
Foreign keyboards available in French, German, Spanish, and the U.K. . . . call		



### Aladdin Systems ... 30 day MBG

**Shortcut 1.0.1**—Enhances every application's Open and Save dialogs with folder and file management features you'll use every day. A 5 mice winner from *MacUser* (Dec. '89) . . . \$46.





**"I must be crazy to play a child's game."**

Dear MacConnection,

My hard drive crashed the other evening when I mistakenly tried to install an un-installable game. I envisaged prolonged down time and thought, "I must be crazy to use my business computer to play a child's game." With dark clouds blowing through my

mind, I rang your technical support department. They worked me through several routines, and within minutes my hard drive was working normally again. They even helped me clear up some mysteries about my System 6.0 that baffled me. Wow MacConnection!

That's terrific technical support!

*Bill Warren*

Bill Warren  
New Hampshire Hydraulics, Inc.  
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Just for the record, all the ads in this series feature photographs of real live MacConnection customers and the real live letters they wrote us. Really!



# Overnight shipping. \$3.

- 4807 Laser Labels 1" x 2 5/8" (Qty. 3000) \$24.  
 4808 Laser Labels 1 1/2" x 4" (Qty. 1400) . 24.  
 4809 Laser Labels 2" x 4" (Qty. 1000) . 24.  
 4810 Laser Labels 8 1/2" x 11" (Qty. 100) . 24.

## ★Basic Needs ... 60 day MBG

- 5635 Keyboard Flip . . . . . 6.  
 5633 LaserWriter Printer Stand . . . . . 28.  
 5634 Large Screen Monitor Stand . . . . . 38.

## ★Computer Coverup ... 60 day MBG

- 1722 ImageWriter LQ Cover . . . . . 8.  
 1723 ImageWriter II Cover . . . . . 8.  
 1720 Mac Plus Cover . . . . . 10.  
 1724 Mac SE Cover . . . . . 10.  
 1725 Mac SE Ext. Keyboard Cover Set . . 10.  
 4657 LaserWriter II Cover . . . . . 10.

## ★CoStar ... 30 day MBG

- 6091 The Organizer . . . . . 239.

## ★Goldstein & Blair ... 30 day MBG

- 2267 The Macintosh Bible (2nd Edition) . 19.

## ★I/O Design ... 30 day MBG

- 2379 MacLuggage Imageware II . . . . . 49.  
 2376 MacLuggage Macinware Plus . . . . 64.  
 2381 MacLuggage Macinware SE . . . . . 75.  
 6129 The Ultimate SE Carrying Case . . . 79.

## ★Kensington ... 30 day MBG

MacConnection carries the entire line of Kensington's accessories. A partial listing follows.

- 2577 Mouseway Pad . . . . . 7.  
 2563 Mouse Pocket ADB . . . . . 8.  
 2569 Mac Plus/SE w/System Saver Cover . 9.  
 2558 ImageWriter II Dust Cover . . . . . 9.  
 2589 Universal Printer Stand . . . . . 15.  
 6066 Custom Control Panel . . . . . 15.  
 4970 Modem/FAX Protector 10 . . . . . 15.  
 4971 Modem/FAX Protector 20 . . . . . 25.  
 4126 LaserWriter II Dust Cover . . . . . 17.  
 2580 Mac II Stand . . . . . 20.  
 2545 Universal Copy Stand . . . . . 22.  
 2573 Tilt/Swivel (platinum) . . . . . 22.  
 2578 Extra Long ADB Keyboard Cable . . 25.  
 2579 Mac II Monitor Cable Extension Kit . 33.  
 4972 Power Tree 10 . . . . . 19.  
 4973 Power Tree 20 . . . . . 27.  
 4974 Power Tree 50 . . . . . 54.  
 2559 Apple Security Kit . . . . . 34.  
 2568 Maccessories SuperBase . . . . . 34.  
 2585 Printer Muffler 80 . . . . . 43.

- 2586 Printer Muffler 80 Stand . . . . . \$24.  
 4070 System Saver SE . . . . . 52.  
 2566 System Saver Mac (platinum) . . . . 63.  
 2567 System Saver Mac (beige) . . . . . 63.  
 2546 A-B Box (DIN-8) . . . . . 63.  
 2556 Maccessories Anti-Glare Filter SE . . 33.  
 5064 Apple Color Monitor Polarizing Filter 63.  
 5065 Full Page Display Polarizing Filter . 63.  
 5066 Two Page Display Polarizing Filter . 135.  
 4941 Mac II Monitor Stand . . . . . 64.  
 4643 Mac II Stand and Cable Kit . . . . . 64.  
 2561 MasterPiece Mac II . . . . . 105.  
 5894 PowerBacker 360 . . . . . 269.  
 5577 PowerBacker 450 . . . . . 339.  
 5578 PowerBacker 520 . . . . . 399.  
 5230 PowerBacker 800 . . . . . 749.  
 5228 PowerBacker 1200 . . . . . 949.

## ★MacConnection ... 60 day MBG

- 4623 Solid Oak Disk Case, made by New England craftsmen (holds 90 disks) . . 29.

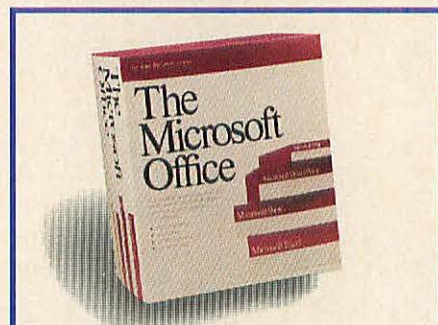
## ★Mobius Technologies ... 60 day MBG

- 4470 Fanny Mac QT . . . . . 59.

## ★Moustrak ... 60 day MBG

Available in blue or gray.

- 2694 Moustrak Pad (standard 7" x 9") . . . 8.  
 2692 Moustrak Pad (large 9" x 11") . . . . 9.  
 2693 Moustrak Pad L/F (9" x 11") . . . . . 10.



## Microsoft ... 30 day MBG

The Microsoft Office—A terrific value. Includes Word 4.0, PowerPoint 2.01, Excel 2.2, Mail 2.0, along with bonuses like AutoMac, WordFinder Thesaurus, and discount coupons for other applications . . . . . \$529.

## ★NoRad ... 30 day MBG

- 5620 Shield for Mac Plus or SE (#2524) . . 99.  
 5622 Shield for Mac II (#2523F) . . . . . 99.

## Ribbons

Available in black, blue, brown, yellow, green, orange, purple, red, silver & gold.

- 3255 ImageWriter II Ribbon . . . . . 4.  
 3261 ImageWriter II 4-Color Ribbon . . . . 9.  
 3270 ImageWriter II Rainbow Six Pack . . . 20.  
 3260 ImageWriter LQ Black Ribbon . . . . 17.  
 4011 ImageWriter LQ 4-Color Ribbon . . . . 20.

## ★Sopris Softworks ... 60 day MBG

- 4171 Mac SE Std. Keyboard Cover (navy) . . 15.  
 4019 Mac SE & Ext. Keyboard Cover (navy) . 15.  
 4017 ImageWriter II Cover (navy) . . . . . 11.  
 4018 LaserWriter II Series Cover (navy) . . 17.  
 4012 High Trek ImageWriter II Carry Case . 49.  
 4013 High Trek Mac Plus Carry Case . . . . 59.  
 4014 High Trek Mac SE & Ext. Kybd. Case . 69.  
 5877 Mac II Monitor Carry Case . . . . . 59.  
 5839 Mac IIcx CPU & Kybd. Carry Case . . 69.



## Datadesk ... 30 day MBG

Mac-101 Keyboard—Includes macro program, MasterStrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, platinum, or ADB version . . . . . \$139.  
 Foreign keyboards are also available . . . . call

- 4861 SE Protection Pak (std. keyboard) . . 65.  
 4862 SE Protection Pak (ext. keyboard) . . 75.

## ★Targus ... 60 day MBG

- 3618 ImageWriter II Carry Case . . . . . 45.  
 3617 Mac Plus/SE Carry Case . . . . . 55.  
 4015 Mac SE & Ext. Kybd. Carry Case . . 69.  
 6116 Mac IIcx Carry Case . . . . . 85.

## ★Tripp Lite ... 30 day MBG

- 6199 Isobar 4 (surge suppressor, 4 outlets) . 49.  
 6200 Isobar 6 (surge suppressor, 6 outlets) . 59.

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**Continental US:** Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne Express the same night for delivery the next business day, except for those within UPS Ground Zone 1 (which is also an overnight service). Saturday delivery available to many areas upon request. The total freight charge on any order placed with MacConnection is now \$3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.

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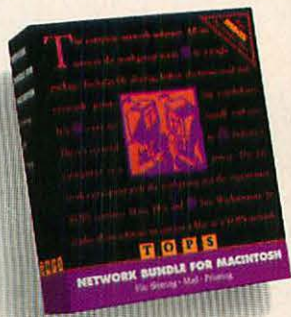


## Cutting Edge ... 30 day MBG

Cutting Edge Hard Drives are fast and reliable with access times as low as 23 milliseconds and a mean time between failure rating of up to 100,000 hours. An outstanding combination of quality and low price. . . . . see line listing.



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## TOPS ... 30 day MBG

Network Bundle for Macintosh 3.0—Allows you to quickly and easily share files, electronic mail and printers between your Apple Macintosh, IBM PC and Sun Workstation . . . . . \$195.

## ★GDT Softworks ... 30 day MBG

- 6256 PrintLink Collection . . . . . 59.
- 6151 JetLink Express 1.02 . . . . . 89.
- 6255 Expressive Fonts . . . . . 119.
- 6257 JetLink/Expressive Fonts Bundle. . . 159.

## ★Kensington ... 30 day MBG

- 2576 Turbo Mouse for Mac Plus 3.0 . . . 109.
- 2547 Turbo Mouse ADB 3.0 . . . . . 109.

## ★Kraft Systems ... 60 day MBG

- 2600 3-Button QuickStick . . . . . 39.
- 4082 3-Button QuickStick ADB . . . . . 49.
- 6099 ADB Trackball (with foot pedal) . . . 79.

## ★Logitech ... 30 day MBG

- 5082 ScanMan Mac . . . . . 325.

## ★LYNX Computer ... 30 day MBG

- 1211 LYNX Trackball . . . . . 59.
- 1212 LYNX Trackball ADB . . . . . 59.

## ★Microseeds Pub. ... 60 day MBG

- 4843 WristMac 1.0 . . . . . 145.
- 5018 WristMac Executive 1.0 . . . . . 189.

## ★Mobius Technologies ... 60 day MBG

- 6126 Cordless Mouse . . . . . 99.
- 4846 MultiScreen . . . . . 315.

## ★Mouse Systems ... 30 day MBG

- 2808 A+ Mouse . . . . . 59.
- 2809 A+ Mouse ADB . . . . . 79.

## ★Nutmeg Systems ... 30 day MBG

- 2993 15" Monitor for Mac II . . . . . 799.
- 6168 15" Monitor for Mac SE/30 . . . . . 799.
- 2992 15" Monitor for Mac Plus . . . . . 999.
- 2994 15" Monitor for Mac SE . . . . . 999.
- 4002 19" Monitor for Mac Plus . . . . . 1195.
- 4096 19" Monitor for Mac SE . . . . . 1195.
- 5680 19" Monitor for Mac SE/30 . . . . . 1195.
- 4097 19" Monitor for Mac II . . . . . 1195.
- 6240 30/2 Interface (SE/30 video board) . 499.

## Olduvai Software

- 5138 Read-It! OCR Personal 2.1 . . . . . 125.
- 3034 Read-It! OCR 2.1 . . . . . 245.

## ★Orange Micro ... 30 day MBG

- 4488 Grappler Spooler . . . . . 38.
- 3036 Grappler C/Mac/GS 2.0 . . . . . 78.
- 4487 Grappler LS 1.0 . . . . . 103.
- 6229 Grappler LX . . . . . 129.

## ★PTI/DataShield ... 30 day MBG

- 5254 MacDirector . . . . . 109.

## Summagraphics

- 4298 BitPad Plus ADB . . . . . 319.

## TheComplete PC

- 6104 TheComplete Half-Page Scanner/400 . . . . . \$315.
- 6103 TheComplete Page Scanner . . . . . 759.

## ★Thunderware ... 30 day MBG

- 3648 ThunderScan 5.0 with PowerPort . . 187.
- 4994 LightningScan . . . . . 369.
- 3645 Mac II Power Accessory . . . . . 45.

## MEMORY & DRIVES

### 1 Meg SIMMs

- 1107 Low profile 80 nanoseconds SIMMs at the best prices. 2 year warranty. . . . call

## ★Cutting Edge ... 30 day MBG

- 3989 800k External Disk Drive (platinum) . 149.
- 5133 20 Meg Hard Drive . . . . . 439.
- 3990 30+ Meg Hard Drive . . . . . 499.
- 3991 45+ Meg Hard Drive . . . . . 549.
- 5275 65+ Meg Hard Drive . . . . . 629.
- 5276 80+ Meg Hard Drive . . . . . 739.
- 5456 44 Meg Removable Drive . . . . . 889.
- 5736 44 Meg Removable Cartridge . . . . 115.

## ★Dove Computer ... 60 day MBG

- 1802 Dove Tool Kit . . . . . 15.
- 1801 SCSI Interface/Port . . . . . 109.
- 5879 MaraThon Serial/Parallel . . . . . 195.
- 1807 MacSnap 524E . . . . . 185.
- 1809 MacSnap 524S . . . . . 239.
- 1811 MacSnap 548E . . . . . 419.
- 1812 MacSnap 548S . . . . . 479.
- 1800 MacSnap 2SE . . . . . 319.
- 1797 MacSnap Plus 2 . . . . . 319.
- 1804 MacSnap 2S . . . . . 209.
- 1805 MacSnap 4S . . . . . 409.

## ACCELERATOR BOARDS

- 1793 MaraThon 020 MSE1 . . . . . 429.
- 1794 MaraThon 020 MSE2 (1 Meg) . . . . . 699.
- 1795 MaraThon 020 MSE3 (math chip) . . 589.
- 1796 MaraThon 020 MSE4 (1 Meg/chip) . . 879.
- 5192 MaraThon 020 MSE5 (4 Meg) . . . . . 879.
- 5193 MaraThon 020 MSE6 (4 Meg/chip) . 1099.
- 4663 MaraThon 030 Accelerator 32 MHz . 969.
- 5878 MaraThon 030x Accelerator . . . . . 969.
- 5880 MaraThon 030 SE/30 Accelerator . . 969.
- 5623 MaraThon Racer . . . . . 149.

## ACCELERATORS (020) W/ETHERNET

- 5391 FastNet LAN 1 . . . . . 1125.



## Intel Corporation

2400EX with MicroPhone 1.5—Combines superior Hayes compatible operation and famous Intel quality at an affordable price. Includes cable and MicroPhone 1.5 software for fast and efficient communications. . . . . \$245.

- 5390 FastNet LAN 2 (1 Meg) . . . . . \$1499.
- 5389 FastNet LAN 3 (math chip) . . . . . 1349.
- 5388 FastNet LAN 4 (1 Meg/chip) . . . . . 1724.
- 5387 FastNet LAN 5 (4 Meg) . . . . . 1499.
- 5386 FastNet LAN 6 (4 Meg/chip) . . . . . 1729.

## IOMEGA

- 5552 44M Ext. Single Bernoulli II Drive. . 1399.
- 5553 44M Ext. Dual Bernoulli II Drive. . 2199.

## ★Kennect Tech. ... 30 day MBG

- 5631 Rapport (includes FastBack II) . . . . 199.
- 5632 Drive 2.4 . . . . . 329.



## Dove Computer ... 60 day MBG

MacSnap 2S and 4S—Improve system productivity and run a greater variety of software with 2 or 4 Megs of expanded RAM. Easy to install. Includes RamSnap, a RAM disk/disk cache utility. MacSnap 2S . . \$209. MacSnap 4S . . \$409.

## ★SuperMac Tech. ... 30 day MBG

SuperMac drives include SuperSpool, SuperLaserSpool, Disklit and Manager

- 5452 Dataframe 20 . . . . . 589.
- 5447 Dataframe XP 30 . . . . . 699.
- 5448 Dataframe XP 60 . . . . . 959.
- 5449 Dataframe XP 100 . . . . . 1279.

## STORAGE MEDIA

## ★Verbatim ... 60 day MBG

- 3772 3 1/2" DS/DD Disks (10) . . . . . 15.
- 3773 3 1/2" HD Disks 1.44 Meg (10) . . . . 29.

## ★Sony ... 60 day MBG

- 3297 3 1/2" DS/DD Disks (10) . . . . . 14.
- 6148 3 1/2" DS/DD Disks 3 Pak (30) . . . . 35.
- 3298 3 1/2" HD Disks 1.44 Meg (10) . . . . 25.

## ★MAXELL ... 60 day MBG

- 2792 3 1/2" DS/DD Disks (10) . . . . . 15.
- 2793 3 1/2" HD Disks 1.44 Meg (10) . . . . 29.

## ★3M ... 60 day MBG

- 3943 DC2000 Tape Cartridge . . . . . 20.

## ACCESSORIES

### Apple Computer

- 1113 Black ImageWriter Ribbon . . . . . 10.
- 1114 LaserWriter Plus Toner Cartridge . . . 111.
- 1115 LaserWriter II Toner Cartridge . . . . 115.

## ★Avery ... 60 day MBG

- 4864 Disk Labels 3 1/2" (Qty. 250) . . . . . 13.
- 5392 Disk Labels—Laser 3 1/2" (Qty. 630) . 29.
- 5403 Address Labels 1 7/16" x 4" (Qty. 1000) . 9.
- 4865 Address Labels 3 1/2" x 1 5/16" (Qty. 3750) . 15.
- 4811 Transparencies 8 1/2" x 11" (Qty. 50) . 22.
- 4813 Round Labels 3 1/3" (Qty. 150) . . . . 7.
- 4812 Laser Labels 1/2" x 1 3/4" (Qty. 2000) . 7.



# Is Your Mac Obsolete?

Sifting  
through  
accelerators,  
memory, and  
other upgrade  
products that  
can keep your  
Mac from  
becoming an  
artifact





by Brita Meng

If all the talk about speedy new Macintoshes and the upcoming System 7.0 leaves you feeling left behind, fear not. There's a lot you can do to keep your Mac up to the latest standards. In fact, no matter what model Macintosh you own, you can upgrade it to use a hard disk, run more applications, or take advantage of System 7.0. For example, you can add more memory or a SCSI port. And, for a price, you can even install an accelerator that will let your Macintosh keep pace with the Mac IIci.

While upgrades offer a way to enhance the Mac's performance, choosing the right one can be confusing. There are several upgrade paths, and not all of them are compatible. Before you open your faithful Mac—and your wallet—carefully consider what you want. Do you want to run MultiFinder? Boost overall performance—or just math calculations? Take advantage of the virtual-memory capabilities of System 7.0? Let's take a look at some upgrade strategies that will let you get the most out of your Mac.

### STRATEGIES FOR THE 128K, THE 512K, AND THE 512KE

Although 128K and 512K Macs are really showing their age, they are by no means out of the upgrade picture. The most important thing you can do for a 128K or 512K Mac is upgrade the 64K read-only memory (ROM) chips to 128K ROM.

There are several ways to get the 128K ROMs. Apple offers a two-part Mac Plus upgrade for 128K and 512K Macs. The first step is the Macintosh Plus Disk Drive Kit, which gives you not only the 128K ROMs, but also an 800K internal floppy



drive. If you have a 512KE Mac, you're lucky—you already have the 128K ROMs and 800K floppy drive. Some third-party vendors, such as MacProducts USA, Peripheral Outlet, and Total Systems, offer comparable ROM and floppy upgrades.

The second part of the official Apple upgrade is the Macintosh Plus Logic Board Kit, which replaces an older Mac main logic board with that of the Mac Plus. The Logic Board Kit includes a SCSI port and 1MB of Single Inline Memory Module

## **You don't have to follow**

**Apple's upgrade path. In fact,**

**third-party upgrades can**

**elevate Mac performance levels**

**at much lower prices.**

(SIMM) memory. You must have the Disk Drive Kit installed either before or at the same time as the Logic Board Kit, because the SCSI port needs the 128K ROMs to function.

You don't have to follow Apple's upgrade path. In fact, third-party upgrades from Dove Computer, MacProducts USA, Computer Care, Spectra Micro Development, Peripheral Outlet, and Newbridge Microsystems can elevate your Mac to either Plus performance levels—or beyond—at much lower prices (see *Conspicuous Consumer* in this issue).

## **STRATEGIES FOR THE PLUS, THE SE, AND THE SE/30**

If you have a standard Plus, SE, or SE/30, the most important enhancement is adding memory. First, because you can't do much with MultiFinder if you have only 1MB of RAM. Second, many new Mac applications require more than 1MB of memory just to run under the Finder. Then there's the future to think about: indications are you'll need at least 2MB to take advantage of the features Apple plans for System 7.0.

After you add memory you can think about buying an accelerator. Because of its design, the only way to increase the Plus's performance is with an accelerator. The SE though, is a different story.

You can upgrade your SE to an SE/30 with Apple's Macintosh SE/30 Logic Board Upgrade Kit. The upgrade exchanges the SE's logic board for that of an SE/30, and the SE's 800K internal floppy drive for the FDHD high-density floppy drive, or SuperDrive. In addition to formatting high-density 1.4MB Mac floppies, the SuperDrive also reads MS-DOS and Pro-DOS disks. Part of the original SE case is also replaced to accommodate the SE/30 Direct Slot bus.

At \$1699, Apple's upgrade is definitely pricey. And you should remember that any add-in SE boards you may have installed (such as video boards for large-screen monitors) are not compatible with the SE/30's 030 Direct Slot bus.

If it's speed you're looking for, you can find a wide variety of SE accelerators with a wide range of prices. On the low end, SuperMac Technology, Siclone Sales & Engineering, Irwin Products Group, and Aox offer 16MHz 68000 boards that can double your SE's speed.

Or you can opt for the third-party high end—an SE accelerator that offers a 68030 processor that's faster than the one in the SE/30. For example, both Total Systems' Gemini 030/25 and MacProducts USA's RailGun 030 SE 25 offer a 25MHz 68030 accelerator for the SE.

If you need the SuperDrive, Apple also has a \$599 SuperDrive upgrade (the Macintosh SE FDHD Upgrade Kit) for SEs bought before August 1989. (Any SEs bought since then include the SuperDrive.) Or you might consider PLI's TurboFloppy 1.4 or Kennect Technology's Drive 2.4, which also enable you to write to and read Mac and IBM PC floppies.

## **STRATEGIES FOR THE MAC II, THE IIX, AND THE IICX**

Despite the fact that Apple no longer manufactures the Mac II, it's still a very useful computer. In fact, as far as enhancements go, the Mac II is probably the most flexible Mac of them all. With its

## **CHECK YOUR IICX**

**A** few old-style, socketed IICX computers did make it out the door before Apple changed its manufacturing process. Here's how you can check to see which type of IICX you have.

First, open the IICX. Look between the power supply and the hard disk. (With the computer facing you, the power supply is in the back, on the right-hand side; the hard disk is in the front, on the right-hand side.) You'll see about a 1-inch space.

Pull the cables out of the way gently, so as not to detach anything. Then, look under the power supply to find the 68030 processor. If you see a 1/4-inch, black layer between the 68030 and the logic board, your CPU is socketed, and you can install a third-party IICX accelerator. If there isn't a layer, your CPU is soldered onto the logic board.

**WARNING:** Unless you have sufficient technical training or knowledge to work inside the Mac, don't do it. High-voltage components may cause physical harm to you as well as to the machine. In addition, you void the Apple warranty the minute you open the machine.

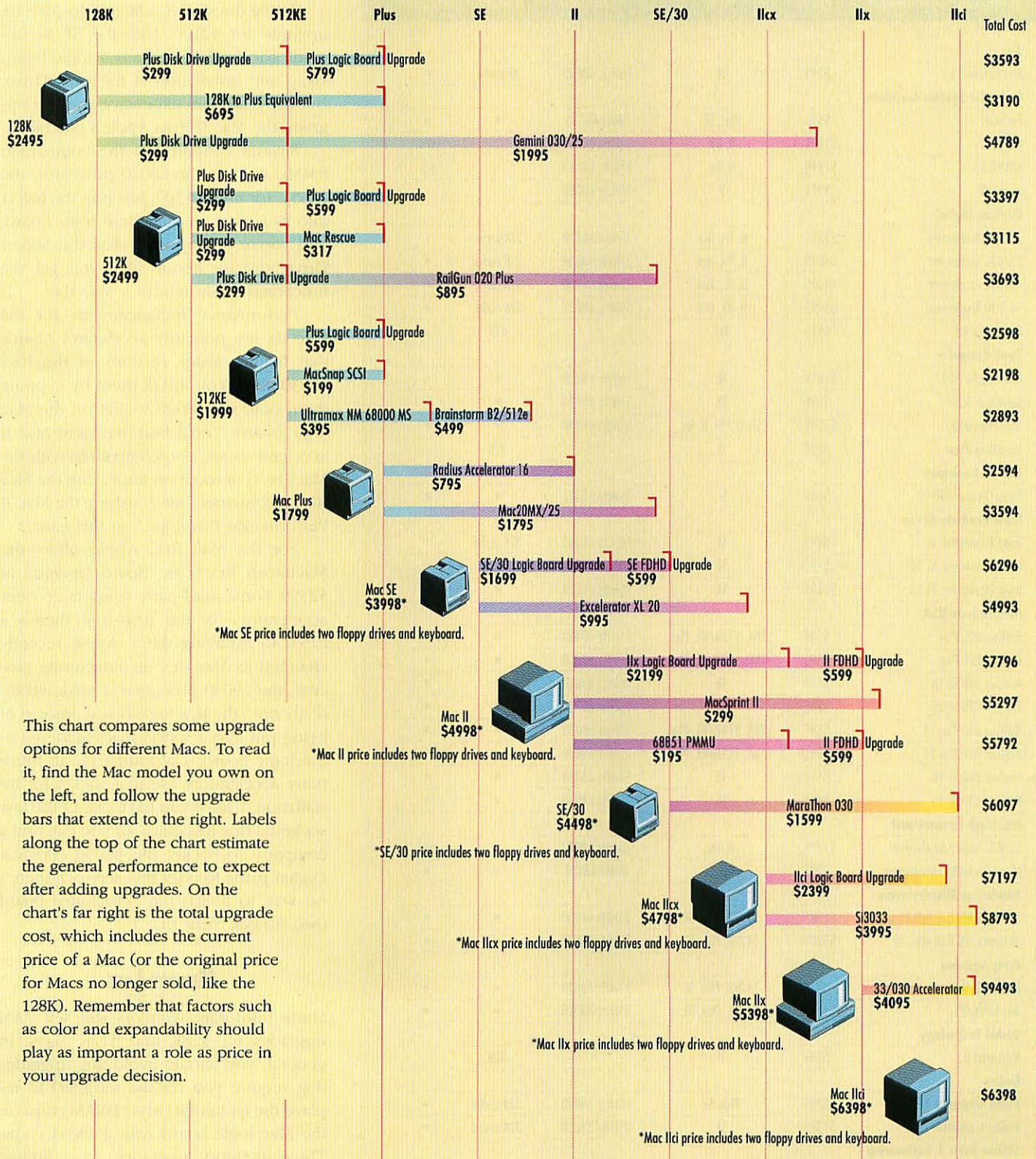
eight SIMM sockets, it can accommodate up to 8MB of memory, using 1MB SIMMs. There are many accelerators available for the Mac II, so you can speed it up to practically whatever you want.

There are two primary differences between the Mac II and the Mac IIX. First, the Mac II has a 68020 processor. Unlike the 68030 used in the IIX, the 68020 does not include a Paged Memory Management Unit (PMMU). Second, the SuperDrive is missing.

Without the PMMU, you won't be able to take advantage of any virtual-memory plans Apple has for System 7.0, nor will you be able to run Connectix's Virtual software. Virtual memory allows the Mac



# THE COST OF UPGRADING





## ACCELERATOR UPGRADES

Vendor and Accelerator	Price <sup>1</sup>	Compatible with	Processor	On-Board Memory <sup>2</sup>	FPU Slot <sup>3</sup>
<b>Aox</b>					
DoubleTime-16	\$395	SE	16MHz 68000	4K cache	•
<b>Computer System Associates</b>					
FastTrack	\$599	Plus, SE	8MHz 68020	•	•
FX882-25	\$1299	II, IIx	25MHz 68882		n/a
FX882-33	\$1799	II, IIx	33MHz 68882		n/a
Over 030	\$995	II	16MHz 68030		
<b>DayStar Digital</b>					
25/030 Accelerator	\$2395	II, IIx, IIcx	25MHz 68030	32K cache	•
33/030 Accelerator	\$4095	II, IIx, IIcx	33MHz 68030	32K cache	•
40/030 Accelerator	\$4995	II, IIx, IIcx	40MHz 68030	32K cache	•
50/030 Accelerator	\$5995	II, IIx, IIcx	50MHz 68030	32K cache	•
Fast Cache IICI	\$995	IICI	<sup>4</sup>	64K	
<b>Dove Computer</b>					
FastNet LAN 020	\$1499	SE	16MHz 68020	•	•
MaraThon 020	\$699	SE	16MHz 68020	•	•
MaraThon 030	\$1599	SE, SE/30, II, IIx	32MHz 68030	•	•
MaraThon Racer	\$259	II	<sup>4</sup>	32K	
<b>GCC Technologies</b>					
HyperCharger 020	\$549	SE	16MHz 68020	•	•
<b>Irwin Products Group</b>					
Irwin Excelsator XL	\$495	SE	16MHz 68000	32K cache	•
Irwin Excelsator XL 20	\$995	SE	20MHz 68020	•	• <sup>5</sup>
Irwin Excelsator XL 25	\$1695	SE	25MHz 68020	•	• <sup>5</sup>
<b>MacProducts USA</b>					
RailGun 020 Plus	\$549	128K, 512K/KE, Plus	16MHz 68020	•	•
RailGun 020 Plus	\$895	128K, 512K/KE, Plus	25MHz 68020	•	•
RailGun 020 SE 16	\$499	SE	16MHz 68020	•	•
RailGun 020 SE 25	\$895	SE	25MHz 68020	•	•
RailGun 030 Plus 16	\$599	128K, 512K/KE, Plus	16MHz 68030	•	•
RailGun 030 Plus 25	\$995	128K, 512K/KE, Plus	25MHz 68030	•	•
RailGun 030 SE 16	\$599	SE	16MHz 68030	•	•
RailGun 030 SE 25	\$995	SE	25MHz 68030	•	•
<b>Microtech International</b>					
33 MHz 68882 Accelerator	\$1799	II, IIx	33MHz 68882		n/a
Microtech 68020 Accelerator	\$599	Plus, SE	8MHz 68020	•	•
<b>Newbridge Microsystems</b>					
Ultramax NM 030 MX-25	\$1595	512KE, Plus, SE	25MHz 68030	•	•
Ultramax NM 030 MXC-33	\$5999	512KE, Plus, SE	33MHz 68030	•	•
<b>Novy Systems</b>					
Mac20MX/16	\$895	512KE, Plus, SE	16MHz 68020	•	•
Mac20MX/25	\$1795	512KE, Plus, SE	25MHz 68020	•	•
<b>Orchid Technology</b>					
MacSprint II	\$299	II	<sup>3</sup>	32K	
<b>Radius</b>					
Radius Accelerator 16	\$795	Plus, SE	16MHz 68020	32K cache	•
Radius Accelerator 25	\$1395	SE	25MHz 68020	32K cache	•
<b>Sidone Sales &amp; Engineering</b>					
SI3033	\$3995	II, IIx, IIcx	33MHz 68030	64K cache	•

to treat part of a hard disk as additional RAM, which lets you run more applications with MultiFinder without having to install SIMMs.

Apple does offer a Mac II-to-Mac IIx upgrade for \$2199. Like the SE/30 upgrade for the SE, it entails a logic board swap and installation of the SuperDrive. But there are less expensive ways to upgrade the Mac II than Apple's official kit.

Several vendors sell the companion PMMU chip to the 68020 processor, the 68851, for under \$300. Just pop the 68851 into its socket on the Mac II logic board, and you're ready to go. Add the SuperDrive and for about \$900 you get the functional equivalent of a Mac IIx.

Performance enhancements for the Mac IIx are primarily accelerator boards that feature faster versions of the IIx's 68030 chip. You install them by clipping them onto the 68020 socket on the Mac logic board. You'll find that most Mac II accelerators are also compatible with the Mac IIx. (For more on improving the Mac II's performance, see "Pushing the Mac II Performance Envelope," in this issue.)

For the Mac IIcx, Apple offers the Macintosh IICI Logic Board Upgrade at \$2399. Some third-party vendors do offer accelerators for the IIcx—but there's a catch to installing them. Apple recently changed its Mac IIcx manufacturing process; the 68030 processor is soldered directly onto the IIcx logic board, instead of being put into a socket that's soldered to the logic board. Unfortunately, all third-party accelerators use that socket for installation. Unless you have one of the few socketed IIcx machines, or you can find a company to socket the 68030 (DayStar Digital plans to offer this service), there's no way to attach the accelerator board (see "Check Your IIcx").

## MEMORY LANE

Some third-party vendors still sell RAM upgrades for 128K and 512K Macs. In general, you should avoid any upgrades that require you (or the installer) to replace the 64-kilobit (Kbit) DRAM chips on the Mac logic board with 256Kbit chips. These memory upgrades have limited potential for future expansion, and all



they're really good for is reducing floppy swaps while you work.

A better choice for expanding 128K, 512K, or 512KE memory are upgrades that use special clips to piggyback expansion boards containing memory to the Mac logic board. Such upgrades can accommodate up to 2MB of RAM and are usually user installable. (You certainly don't have to find a soldering iron.) Nevertheless, the clips can still be tricky to place correctly. If you carry your Mac around regularly, make sure that the clips are secure, so you don't disconnect a piggybacked expansion board during transport.

Starting with the Mac Plus, Apple decided to use SIMMs for memory, rather than soldering memory chips to the Mac logic board (as was done for the earlier models). These SIMMs sit in SIMM sockets on the Mac logic board. The standard Mac Plus and SE have four SIMM sockets, each of which contains one 256-kilobyte (256K) SIMM; the SE/30, Mac II, IIx, and IICx come with eight SIMM sockets, four of which have one 256K SIMM in them, and four of which are empty.

Each of the 256K SIMMs that comes with these standard Macs has eight 256

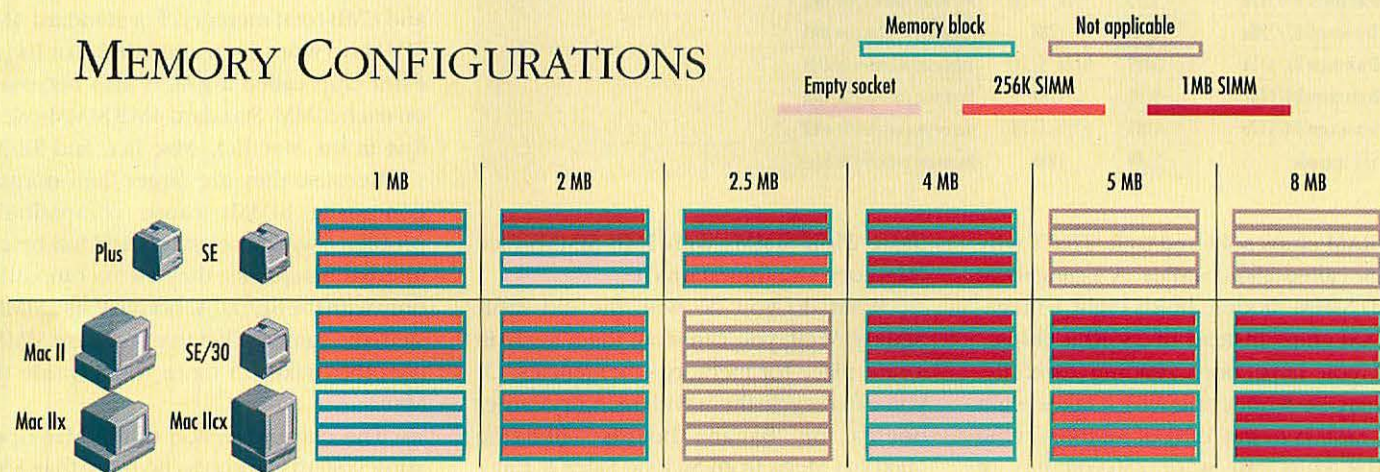
## ACCELERATOR UPGRADES (CONTINUED)

Vendor and Accelerator	Price <sup>1</sup>	Compatible with	Processor	On-Board Memory <sup>2</sup>	FPU Slot <sup>3</sup>
<b>Sidone Sales &amp; Engineering</b>					
Si3050	\$5495	II, IIx, IICx	50MHz 68030	64K cache	•
Turbo SE	\$398	SE	16MHz 68000	•	•
<b>Spectra Micro Development</b>					
ProBoard	\$995	128K, 512K/KE, Plus	16MHz 68020	•	•
ProBoard-SE	\$795	SE	16MHz 68020	•	•
<b>SuperMac Technology</b>					
SpeedCard	\$199	SE	16MHz 68000		•
<b>Total Systems</b>					
Gemini 020/16	\$995	128K, 512K/KE, Plus	16MHz 68020	•	•
Gemini 020/25	\$1595	128K, 512K/KE, Plus	25MHz 68020	•	•
Gemini 020/16	\$795	SE	16MHz 68020	•	•
Gemini 020/25	\$1395	SE	25MHz 68020	•	•
Gemini 030/16	\$1395	128K, 512K/KE, Plus	16MHz 68030	•	•
Gemini 030/20	\$1595	128K, 512K/KE, Plus	20MHz 68030	•	•
Gemini 030/25	\$1995	128K, 512K/KE, Plus	25MHz 68030	•	•
Gemini 030/16	\$1195	SE	16MHz 68030	•	•
Gemini 030/20	\$1395	SE	20MHz 68030	•	•
Gemini 030/25	\$1795	SE	25MHz 68030	•	•
Voyager 030/33	\$4195	II, IIx	33MHz 68030	64K cache	•

<sup>1</sup> For base configuration. <sup>2</sup> On-Board Memory indicates either the size of the RAM cache, or that you can add on-board RAM. <sup>3</sup> FPU Slot indicates whether or not you can add a floating point coprocessor (68881 or 68882).

<sup>4</sup> Means you can also add a PMMU memory-management chip (of course, memory management is built into all Macs and upgrades that employ the 68030 CPU). <sup>5</sup> High-speed cache memory board

## MEMORY CONFIGURATIONS



A Mac Plus or SE has four SIMM sockets. They can handle 1MB (the standard configuration), 2MB, 2.5MB, or 4MB of RAM. When you upgrade the memory in a Plus or SE, you must buy SIMMs (256K or 1MB) two at a time. Each individual SIMM only provides 8 bits of the 16 bits the 68000 CPU uses for data. In addition, you'll have to disconnect (cut) a resistor on both the Plus and SE main logic boards when you add memory. A Mac SE/30, II, IIx, or IICx has eight SIMM sockets. Each of these machines can accommodate 1MB (the standard configuration), 2MB, 4MB, 5MB, or 8MB of RAM. To add memory to these Macs, you must buy SIMMs (256K or 1MB) four at a time. That's because the 68020 and 68030 CPUs use 32-bit-wide data; each SIMM by itself only provides 8 bits.



## MEMORY UPGRADES

Vendor and Products	Price	Compatible with	Comments
<b>Clearpoint Research</b>			
MC2RAM/4 MB	not avail.	IIx, IIcx	Increases memory up to 32MB, for A/UX systems
<b>Computer Care</b>			
Softstep I	\$150	Plus, SE	Increases memory to 2MB with carrier board; includes SIMMs
Softstep III	\$300	II, IIx	Carrier board for building 1MB SIMM with 256K SIMMs
Softstep IV	\$99	Plus	Increases memory to 2MB with carrier board; does not include SIMMs
Softstep V	\$139	SE	Increases memory to 2MB with carrier board; does not include SIMMs
<b>Digi-Graphics</b>			
SIMM Adaptor	\$299	128K, 512K	Adds 4 SIMM sockets; includes SCSI port
<b>Dove Computer</b>			
MacSnap 2SE	\$499	SE	Increases memory to 2MB; does not permit further expansion
MacSnap 524	\$319	512K	Increases memory to 1MB
MacSnap 524E	\$299	512KE	Increases memory to 1MB
MacSnap 524S	\$399	512KE	Increases memory to 1MB; includes SCSI interface
MacSnap 548	\$719	512K	Increases memory to 2MB
MacSnap 548E	\$699	512KE	Increases memory to 2MB
MacSnap 548S	\$799	512KE	Increases memory to 2MB; includes SCSI interface
MacSnap Plus 2	\$499	Plus	Increases memory to 2MB; does not permit further expansion
<b>Julian Systems</b>			
Ram II	not avail.	Plus, SE	Increases memory to 2MB
Ram II+II	not avail.	Plus, SE, SE/30, II, IIx, IIcx, IIci	Increases memory to 4MB
RAMPLUS II	not avail.	Plus	Augments memory by 2MB
RamPlus 4	not avail.	Plus	Augments memory by 4MB
<b>Mac Doctor Electronics</b>			
Brainstorm B1/128e	\$345	128K	Increases memory to 1MB
Brainstorm B1/512e	\$295	512K, 512KE	Increases memory to 1MB
Brainstorm B2/128e	\$549	128K	Increases memory to 2MB
Brainstorm B2/512e	\$499	512K, 512KE	Increases memory to 2MB
Brainstorm B4/128e	\$999	128K	Increases memory to 4MB
Brainstorm B4/512e	\$949	512K, 512KE	Increases memory to 4MB
512 Upgrade	\$189	128K	Increases memory to 512K

Kbit RAM chips soldered to it. That's why they're called 256K SIMMs. A 1-megabyte (1MB) SIMM module holds eight 1-megabit RAM chips instead of 256Kbit chips.

If you have been reading carefully, you may be wondering why it takes eight 256K SIMMs to get 1MB of memory. One 256Kbit chip can store 256,000 bits of information, but only 1 bit is accessible at a time. The CPU in the Mac Plus and SE, however, needs to access 16 bits at a time. Eight 256Kbit chips on one SIMM provide only half of that 16—8 bits (1 byte) of memory. Thus, the Mac needs two SIMMs to represent its 16-bit data. To increase memory, all you have to do is replace

those 256K SIMMs with 1MB SIMMs (see "Memory Configurations").

What do you do with the old 256K SIMMs? Well, you can store them away in a safe place for memory emergencies. Or you can recycle them with memory carrier boards, or "banana boards," like the MaxPlus Mega from Siclone Sales & Engineering and Julian Systems' RAMPLUS II.

These two carrier boards have four SIMM sockets. You plug the 256K SIMMs into those sockets, then plug the entire carrier board into a SIMM socket on the Mac Plus logic board. The Mac then sees the carrier board as a 1MB SIMM. There is, however, one thing to remember about

carrier boards. They sit at an angle over the Plus's 68000 processor and prevent you from installing a clip-on accelerator.

Several vendors now offer 4MB memory upgrades. Standard 4MB SIMMs use 4-megabit RAM chips on a SIMM circuit board. Composite 4MB SIMMs combine several 1-megabit chips on ex-

**If you can only afford one upgrade for your Mac, make it memory. You'll need at least 2MB to run Apple's new version of system software.**

tra-large SIMM boards for an equivalent 4MB of RAM. Installing 4MB SIMMs lets you boost the total memory in Macs to 32MB, but beware of compatibility issues.

Original Mac II ROMs are incompatible with either 4MB SIMM type. To use 4MB SIMMs in a II, you must get the SuperDrive upgrade, which includes Mac IIx ROMs that can handle 4MB SIMMs. Nonupgraded IIs are limited to 1MB SIMMs and 8MB total memory. For standard 4MB SIMMs to work in an upgraded II or IIx, an extra chip called a PAL is also necessary on each SIMM. Standard 4MB SIMMs work fine in the Mac IIcx, Mac IIci, and SE/30.

Because they are larger than normal, composite SIMMs cause compatibility problems with accelerators and full-height internal hard disks; they are incompatible only with the SE/30. Although these SIMMs sit in the same socket that standard SIMMs use, they take up more room inside the Mac.

The current version of the Mac operating system can access no more than 8MB of physical SIMM memory. For the SE/30, SuperDrive-upgraded II, IIx, IIcx, and IIci, that 8MB cap will disappear when Apple introduces System 7.0. The 68000-based Mac Plus and SE are limited to 4MB, even with System 7.0.

There are some ways to get the most out of these high-capacity SIMMs now.



You can run A/UX, for instance, and Newer bundles its composite SIMMs with a program called FastDrive, which uses the extra memory as a RAM disk.

## SIMM ADVICE

When you're buying SIMMs it's important to remember that not all SIMMs are created equal.

SIMMs have different heights (see "Know Your SIMMs"). Dual In-line Package (DIP) SIMMs are taller than surface-mount SIMMs. You might hear DIP SIMMs referred to as high-profile SIMMs. Surface-mount, also called surface-oriented-joint (SOJ), SIMMs are low-profile SIMMs.

Depending on the Mac you own, SIMM height will make a difference. You should not install DIP SIMMs in a Mac SE because the SIMMs' height can interfere with add-in boards. And in a Mac II or Mac IIfx, you shouldn't use DIP SIMMs because they may prevent installation of certain internal full-height hard disks. Those drives usually do not leave enough room for DIP SIMMs, and if you already have a full-height internal hard disk installed, you won't be able to use DIP SIMMs for the same reason. You'll have no problem with DIP SIMMs, however, if you have a Mac SE/30, IIfx, or IICI.

Another thing you'll often see references to is the speed of a SIMM—more accurately, the speed of the RAM chips used on the SIMM. The Mac Plus or SE requires at least 150-nanosecond (ns) RAM on a SIMM. An SE/30, II, IIfx, or IIfx requires at least 120ns memory. The IICI must use 80ns chips.

Because each Mac is designed to use memory at a specific speed, faster memory won't make the Mac run any faster. A Mac Plus will always wait 150ns for data it requests from memory, whether the SIMMs run at 150ns, 100ns, or 80ns.

There is nothing wrong with buying faster memory than your Mac needs. Even if those 100ns SIMMs won't speed up your Mac, they will still allow you to run more applications under MultiFinder.

If anything, you should look at that memory as a future investment. For example, if you buy a new IIfx or SE/30, you can use the same SIMMs you bought for

## MEMORY UPGRADES (CONTINUED)

Vendor and Products	Price	Compatible with	Comments
<b>MacProducts USA</b>			
128K-1MB	\$299	128K	
128K-2MB	\$897	128K	
128K-4MB	\$1147	128K	
128K-512K	\$149	128K	
512K-1MB	\$149	512K	
512K-2MB	\$748	512K	
512K-4MB	\$998	512K	
512KE-1MB	\$149	512KE	
512KE-2MB	\$449	512KE	
512KE-4MB	\$699	512KE	
4MB SIMM Module	not avail.	II, IIfx, IIfx	Carrier board for 1MB SIMMs; parity option
<b>Pinnacle Sales International</b>			
4MB MIMM	\$745	II, IIfx IIfx	Augments memory by 4MB
LXPI 2 Plus	\$1558	Portable	Increases memory by 2MB
<b>Siclone Sales &amp; Engineering</b>			
MaxPlus Mega	\$198	Plus	Increases memory to 2MB
RAM-TO-GO/to 3MB	\$1699	Portable	Increases memory to 3MB
RAM-TO-GO/to 4MB	\$2499	Portable	Increases memory to 4MB
RAM-TO-GO/to 5MB	\$3299	Portable	Increases memory to 5MB
<b>Total Systems</b>			
512UP	\$295	128K	Increases memory to 512K
Dav115	\$499	128K	Increases memory to 1MB; compatible with either 64K or 128K ROMs
Dav201	\$499	Plus	Increases memory to 2MB
Dav201SE	\$499	SE	Increases memory to 2MB
Dav524	\$299	512K, 512KE	Increases memory to 1MB; compatible with either 64K or 128K ROMs
Dav524S	\$349	512KE	Increases memory to 1MB; includes SCSI port; requires 128K ROMs
Dav548	\$599	512K, 512KE	Increases memory to 2MB; compatible with either 64K or 128K ROMs
Dav548S	\$649	512KE	Increases memory to 2MB; includes SCSI port; requires 128K ROMs
1024UP	\$245	512K, 512KE	Increases memory to 1MB

your original Mac to enhance memory in the new Mac. In addition, you'll find that high-speed accelerator boards also require higher-speed RAM. So if you buy an accelerator that provides on-board memory-expansion slots, you can also transfer the SIMMs from the Mac logic board to the accelerator board.

Under no circumstances, however, do you want to use memory that runs slower than the speed specified for your Mac. Because the speeds of most RAM chips are rated conservatively, your Mac may function nicely at first—but only for a limited amount of time. Nasty problems—system

hangs, locks, and crashes—will occur sooner or later.

You can mix SIMMs of different speeds in the Mac, with two conditions. First, make sure that all the SIMMs run at, or faster than, the specified speed. Second, all the SIMMs in a bank must run at the same speed; the two banks themselves don't have to match up (see "Memory Configurations"). A good way to determine the speed of your SIMM is by examining the part number on the top of a RAM chip. If the part number ends with 15, you've got 150ns SIMMs; if it ends with 12, the chips run at 120ns, and so forth.



## SYSTEM UPGRADES

Product	Vendor	Price	Comments
<b>Upgrades for 128K Systems</b>			
Macintosh Plus Disk Drive Upgrade	Apple Computer	\$299	Includes 128K ROMs, 800K internal floppy drive
Macintosh Plus Logic Board Upgrade	Apple Computer	\$799	Provides SIMM sockets, SCSI port; requires Macintosh Plus Disk Drive Kit
128K-512KE Upgrade	MacProducts USA	\$448	Includes 128K ROMs, 800K internal floppy drive, optional SCSI port
128K-1MB Upgrade	MacProducts USA	\$598	Includes 128K ROMs, 800K internal floppy drive, SCSI port, optional 1MB RAM
128K to Plus Equivalent	Peripheral Outlet	\$695	Includes 1MB SIMM, SCSI port, 800K internal floppy drive, 128K ROMs
Mac Rescue	Computer Care	\$317	Provides 6 SIMM sockets, SCSI port; requires 128K ROMs, 800K internal floppy drive
Ultramax NM 68000 MS	Newbridge Microsystems	\$395	Requires 128K ROMs; includes SCSI port, memory expandable to 4MB, optional video adapter
<b>Upgrades for 512K Systems</b>			
Macintosh Plus Disk Drive Upgrade	Apple Computer	\$299	Includes 128K ROMs, 800K internal floppy drive
Macintosh Plus Logic Board Upgrade	Apple Computer	\$599	Provides SIMM sockets, SCSI port; requires Macintosh Plus Disk Drive Kit, optional SCSI port
512K-1MB Upgrade	MacProducts USA	\$299	Includes 128K ROMs, 800K internal floppy drive, SCSI port, optional 1MB RAM
512K to Plus Equivalent	Peripheral Outlet	\$625	Includes 1MB SIMM, SCSI port, 800K internal floppy drive, 128K ROMs
Mac Rescue	Computer Care	\$317	Provides 6 SIMM sockets, SCSI port; requires 128K ROMs, 800K internal floppy drive
Ultramax NM 68000 MS	Newbridge Microsystems	\$395	Requires 128K ROMs; includes SCSI port, memory expandable to 4MB, optional video adapter
<b>Upgrades for 512KE Systems</b>			
Macintosh Plus Logic Board Upgrade	Apple Computer	\$599	Provides SIMM sockets, SCSI port; requires Macintosh Plus Disk Drive Kit
512KE-1MB and SCSI Upgrade	MacProducts USA	\$218	Includes 1MB RAM, SCSI port
512KE to Plus Equivalent	Peripheral Outlet	\$295	Includes 1MB SIMM, SCSI port
Mac Rescue	Computer Care	\$317	Provides 6 SIMM sockets, SCSI port
Ultramax NM 68000 MS	Newbridge Microsystems	\$395	Requires 128K ROMs; includes SCSI port, memory expandable to 4MB, optional video adapter

## ACCELERATOR OPTIONS

One thing to consider is whether you really need a full-blown accelerator in the first place. Two vendors, Orchid Technology and Dove Computer, offer cache memory boards that can boost average Mac II performance to be 15 percent better than that of a IIx. The boards do this by storing the most recently used data and instructions in high-speed memory, which the Mac's processor can access faster than regular RAM. And they cost much less

than accelerators that include a CPU.

If you only need faster mathematical calculations, you might take a look at the special-purpose accelerators from Microtech International and Computer System Associates. These accelerators, which are actually piggybacked expansion boards, include high-speed versions of the 68881 or 68882 floating-point processor unit (FPU). (The 68882 is a newer version of the 68881 math processor chip; a 16MHz 68882 calculates twice as fast as a 16MHz 68881.)

Typically, a 25MHz or 33MHz 68882 FPU is forced to run at the speed of a 16MHz CPU. The design of the Computer System Associates' FX882 series and Microtech's 33MHz 68882 Accelerator decouples the 68882 from the CPU, allowing it to run as fast as it can.

The disadvantage of the memory-cache boards and FPU accelerators is that they are incompatible with any other accelerators you might want to install later.

**C**onsider whether you

really need a full-blown

accelerator. Cache boards and

math accelerators can also

improve Mac performance.

It's not a matter of software not working correctly; it's simply one of space. All the products clip onto the CPU socket on the Mac logic board—but since there's only one socket, you can only install one product at a time.

Buying an accelerator board pretty much amounts to buying a new Mac system. Most accelerator boards can be enhanced with memory, coprocessors, SCSI ports, and even large-screen monitors. Evaluate the accelerators as carefully as you would a Mac. Which processor does a board use, and how fast is it? Is there room on the board for a 68881 or 68882 floating-point processor? Room for the 68851 PMMU? How about memory expansion? Will the accelerator allow you to install other enhancements, like a large-screen monitor?

## PROCESSOR PONDERINGS

Processors available on accelerators range from a 16MHz 68000 to a 50MHz 68030. Just for comparison's sake, the Mac Plus and the SE use an 8MHz 68000, and the Mac II, a 16MHz 68020; the SE/30, IIx, and IIfx all include a 16MHz 68030. The IIfx, Apple's fastest Mac, uses a 25MHz 68030.



When you opt for a full-blown accelerator, keep in mind two things about processors. First, boards with identical configurations—that is, those that use the same CPU, running at the same speed—don't necessarily yield identical performance. Second, while faster processors may mean bigger performance boosts, they also mean emptier wallets.

Most of the accelerator boards have room to plug in a math coprocessor chip like the 68882. You'll find that you can buy the chip either with the accelerator or separately, from an independent vendor. Should you decide to go the independent route, remember that FPUs come in different speeds too. Try to match the FPU speed with that of the CPU.

On the other hand, few of the 68020-based—and none of the 68000-based—accelerator boards provide a socket for the 68851 PMMU. Remember, the PMMU is necessary for virtual memory. If you know that you will want to use virtual memory, buy a 68030-based accelerator. That way you won't have to worry about whether or not there is room for a 68851 PMMU on the board: the memory-management circuitry is already built into the 68030 processor.

## UNDERSTANDING ACCELERATOR MEMORY

To take advantage of faster processors, an accelerator needs faster access to memory. The first way to accomplish this is by putting SIMM sockets directly on the accelerator. That's because accelerator CPUs can access on-board memory faster than they can access memory on the Mac logic board. As a result, you may have to buy faster SIMMs than those currently installed in your Mac—especially if you have a Plus or SE.

The second way to get faster access to memory is by using a high-speed cache on the accelerator to store the most recently used instructions and data. The cache cuts down the number of times the accelerator CPU has to go to logic board memory and thus improves memory-access times. The larger the cache, the more data it can keep in memory.

Check how compatible the accelerator is with other Mac enhancements—

## SYSTEM UPGRADES (CONTINUED)

Product	Vendor	Price	Comments
<b>Apple Upgrades for SE/II/IIcx Systems</b>			
Macintosh SE/30 Logic Board Upgrade	Apple Computer	\$1699	Upgrades SE to SE/30
Macintosh IIx Logic Board Upgrade	Apple Computer	\$2199	Upgrades II to IIx
Macintosh IIcx Logic Board Upgrade	Apple Computer	\$2399	Upgrades IIcx to IIci
<b>Floppy Drive Upgrades</b>			
Drive 2.4	Kennect Technology	\$495	Requires S295 Rapport floppy drive controller
Macintosh SE SuperDrive Upgrade	Apple Computer	\$599	Includes SuperDrive ROM Kit
Macintosh II SuperDrive Upgrade	Apple Computer	\$599	Includes SuperDrive ROM/SWIM
TurboFloppy 1.4	PLI	\$399	For all Macs with SCSI port
<b>SCSI Upgrades for 512KE Macs</b>			
Brainstorm SCSI	Mac Doctor Electronics	\$142	
Dov501	Total Systems	\$149	
FastPort	Mirror Technologies	\$147	
Mac SCSI Upgrade	MacProducts USA	\$69	
MacSnap SCSI	Dove Computer	\$199	
SCSI Mac	Julian Systems	\$149.95	
TSI501	Total Systems	\$99	
<b>FPU Chip Upgrades</b>			
68881 FPU	Bay Tech	\$100	
68881 FPU	Tercom	\$145	
68882 FPU	Bay Tech	\$200	
68882 FPU	Tercom	\$295	
<b>PMMU Chip Upgrades</b>			
68851 PMMU	MacProducts USA	\$149	
68851 PMMU	Total Systems	\$195	
68851 PMMU	Bay Tech	\$190	
68851 PMMU	Tercom	\$179	
68851 PMMU	Apple Computer	\$499	

this is especially important for SE owners who own a large screen or plan to purchase one. For example, Radius accelerators provide connections only for Radius large-screen monitors. Owners of the Mac II and IIx won't have to worry quite as much about these expansion issues. If you want a large screen, just plug in an add-in NuBus video board.

## POWER TIPS

Whenever you add an enhancement to the Mac—whether it's memory, an accelerator, or an add-in board—you increase

the load on the power supply in the Mac. Too much load, and that power supply can blow up.

The power supplies in the Mac 128K, 512K, 512KE, and Plus are particularly susceptible to overloading, and tales of woe abound. Reports indicate that a well-equipped Mac IIcx (all three expansion slots used, lots of memory) pushes the limit of its power supply as well.

To keep the worst from happening, you should always check the voltage draw of your Mac with a digital voltmeter after adding an enhancement or upgrade. (As a further incentive, consider that Apple raised



## SIMM SELLERS

## Vendor by sizes offered

## Phone

## 256K, 1MB

Apple Computer	408/996-1010
Computer Care	800/950-2273
Delta Research Laboratories	800/999-1593
Dove Computer	800/622-7627
Mac Discount Warehouse	800/233-4426
MacProducts USA	800/622-3475
Memory Module Technology	313/229-9303
Micron Technology	800/642-7661
Peripheral Outlet	405/332-6581
Pinnacle Sales International	800/622-1722
Third Wave Computing	800/284-0486

## 256K, 1MB, 4MB

American Micro Distributors	714/840-5560
American Scientific	702/362-5353
Clearpoint Research	508/435-2000
Newer Technology	800/678-3726

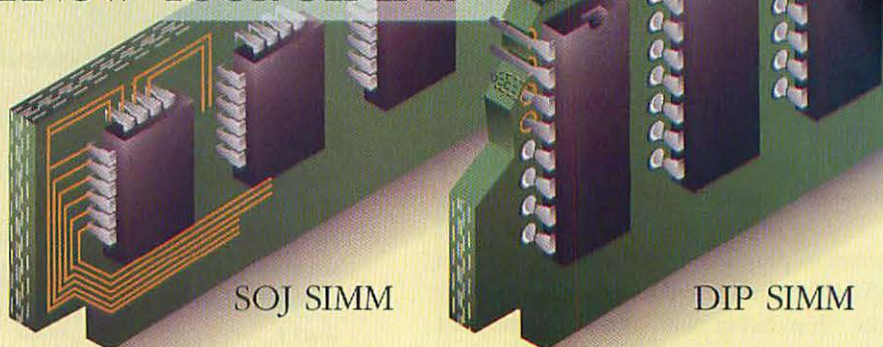
## 1MB

Allegiance Group	800/726-7466
Benchmark Labs	305/771-9759
CDA Computer Sales	201/832-9004
CDC Enterprise	714/630-4633
Computer Centers	602/220-0145
Data Memory Systems	800/662-7466
Digi-Graphics	801/544-2009
Dr. Mac	800/825-6227
Hardware House	800/726-4622
Mac Doctor Electronics	415/964-2131
MacConnection	800/334-4444
MacLand	800/333-3353
MacTel Technology	800/950-8411
MacWarehouse	800/255-6227
Memory Masters	800/726-2897
Micro Electronic Technology	800/766-7466
Mirror Technologies	800/654-5294
Optimal Technology	413/256-1257
Palo Alto RAM	415/858-0125
Programs Plus	800/832-3201
Shecom Computers	800/366-4433
Siclone Sales & Engineering	408/263-8207
South Coast Electronics	800/289-8801
Technology Works	800/622-2210
The Chip Merchant	800/426-6375
Turbo Technologies	800/542-7466

## 1MB, 4MB

Microtech International	800/325-1895
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## KNOW YOUR SIMMs



What's the difference between Dual In-line Package (DIP) SIMMs and surface-mount (SOJ) SIMMs? The answer is the size of the chips and how they are attached to the SIMM circuit board. Connectors on surface-mount chips are soldered directly to the surface of the SIMM circuit board. DIP chips have connectors that protrude through holes in the circuit board; they're soldered in place on the back of the board.

DIP-style memory chips are also larger than their surface-mount counterparts. As a result, the DIP chips require a larger-width SIMM circuit board than surface-mount chips do. When you install a SIMM, the DIP SIMM (right) is sitting taller in the SIMM socket than the surface-mount SIMM (left). That's why a DIP SIMM is described as a high-profile SIMM, and a SOJ SIMM a low-profile SIMM.

the prices on its replacement power-supply units several months ago.) If a dealer installs the upgrade, make sure the dealer takes this precaution.

If you're a do-it-yourselfer, and you don't have access to a voltmeter, take your Mac to a dealer after installing an upgrade, and have the dealer check the Mac. Just remember that opening your Mac does violate Apple's warranty. In addition, AppleCare does not cover any damage done by third-party products to Apple parts. If you're the least bit unsure about installing something, take it to a dealer.


## FINDING YOUR WAY

The last thing you want to hear if you just bought a Macintosh is that you should buy a new one. Upgrading your machine

offers a practical way to keep up with the flurry of new features, which never seems to end.

Apple's upgrades let you follow the official Apple path, but they are limited in number and usually more expensive than comparable third-party upgrades. Third-party upgrades can take your Mac places that Apple upgrades won't.

If you opt for a third-party upgrade, beware of those from fly-by-night companies. This is particularly true with SIMMs. Price shouldn't be your only consideration—quality, reputation, warranties, and support can save you more money in the long run than a great bargain will. You can find out more about products and companies by talking with other users.

However, it isn't a simple process. There are so many choices for enhancements that things get very confusing. To keep your head above the tumult, think seriously about what you want now out of your Mac—and what you want in the future. 

See *Where to Buy* for contact information.

*Macintosh SIMMs can range in size from low-density 256K SIMMs to high-density 4MB SIMMs. These companies make SIMMs for the Macintosh. (Prices aren't included because SIMM prices change so fast; call the companies for current information.)*



*P u s h i n g t h e*  
**MAC II PERFORMANCE**  
*E n v e l o p e*



*S*ix years ago Apple introduced the original Mac; last September Apple announced a second major advance in hardware performance—the Macintosh IIfx. With a faster processor (25MHz 68030), on-board video, and an optional RAM cache, a fully configured Mac IIfx now runs software eight to ten times faster than the 68000 Macintosh models.

*But how does the IIfx compare to the Mac II with its 16MHz 68020 processor or to the SE/30, IIfx, or IIfx with 16MHz 68030 processors? If you own or contemplate owning one of those machines, do you really need to upgrade to the IIfx? Probably not, but those who will benefit from the improved computing power must decide whether they should drop an*

BY BRUCE F. WEBSTER



accelerator into their current Mac or go ahead and add the IICI to their shopping list. Which option is best?

To help answer these questions, we ran benchmark tests on the various configurations and then plotted performance against cost. Read on for our results and recommendations.

## SETTING THE STANDARD

The IICI now clearly sets the Macintosh standard. Enhanced performance can be attributed to higher clock rate, the choice of microprocessor for the CPU, and use of an optional cache. One other factor—built-in video—can also affect performance. Let's take a look at each of these variables.

The speed of a computer's CPU depends on its clock rate, measured in megahertz (MHz). Each machine instruction takes a certain number of clock cycles, and the clock rate refers to how many clock cycles there are per second. The Mac

IICI has a clock rate of about 25MHz—25 million cycles per second—as opposed to the 16MHz clock rate of the Mac II, IIX, and IICX. This higher speed gets work done more quickly, but it also requires faster RAM chips—the Mac IICI uses memory with a read-write access time of 80 nanoseconds (ns), as opposed to the 120ns chips used for the Mac II.

Because of the architectural differences between the Motorola 68020 and the 68030, the microprocessor used for the CPU also affects execution speed. While both the Mac II and the Mac IIX have the same clock rate, the Mac II uses a Motorola 68020 processor and the Mac IIX uses a 68030, which gives the IIX a 15 percent to 20 percent general performance increase. Besides using the 68030, the IICI supports that processor's burst mode, which, along with the higher clock rate, gives the IICI a slight edge over the IIX and IICX.

In addition, the Mac IICI has a special slot for an optional cache board (see

"What's the Cache?"). When installed, the cache board lets the CPU store and update copies of frequently accessed code and data in its high-speed memory. This avoids the delay involved in read-write operations with main memory. One of the money-versus-speed trade-offs to consider, however, is the fact that cache boards use static RAM, which tends to be expensive.

The Mac II was unique in that it used separate video boards for all displays. While this created a lot of flexibility, it also affected performance, since all images being written to the screen had to be transferred to the video board via NuBus data lines. The Mac IICI reversed that trend by including built-in video. The video memory is allocated from regular memory, which can speed up drawing to the screen. Because of the need to coordinate memory access between the 68030 and the video circuitry, however, the built-in video can slow down execution.

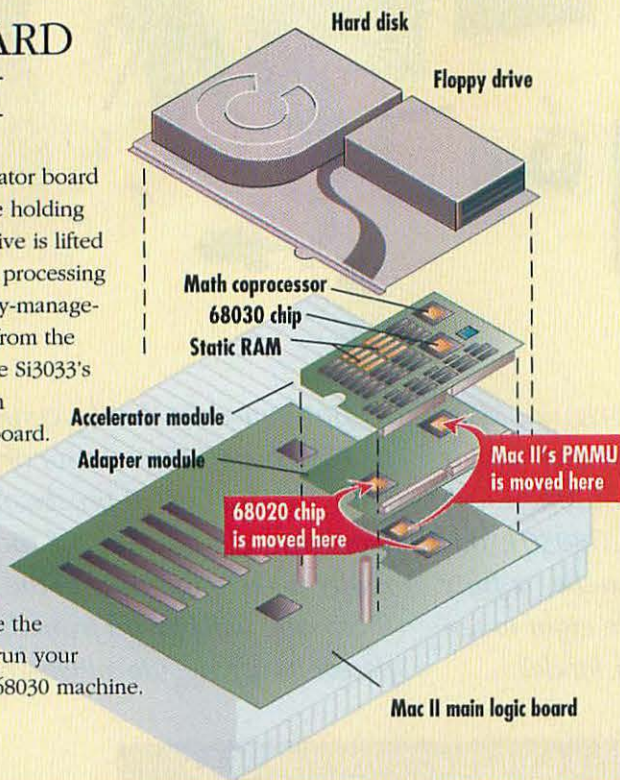
## COMPARING APPLES AND APPLES

What do all these performance boosts mean to a Mac user? To find out, we ran a set of simple benchmarks—Work, Float, Draw, Launch, Recalc—on the four configurations: stock IICI, IICI with cache (32K cache board from DayStar Digital), IICI with external video board (Macintosh II 8-bit Display Video Card), and IICI with cache and external video board. We ran the same benchmarks on a Macintosh II; a Mac II with a 33/030 accelerator (from Siclone); a Macintosh IIX; a IIX with the same 33/030 accelerator; and a IIX with 25MHz and 50MHz versions of the DayStar 68030 accelerator. The Siclone 33/030 accelerator came with a 64K cache, while the DayStar boards had a 32K cache. The five benchmarks were all run under Finder and in 1-bit display mode. They were also run under 8-bit mode on the Mac IICI to test for memory contention; only the Draw benchmark was run in 8-bit mode on the non-IICI systems.

On the Macintosh IICI, the cache board boosted performance in all benchmarks but one: the Work benchmark, which uses some small, CPU-intensive routines. This is probably because the inner loops in

## INSTALLING THE Si3033 BOARD ON A MAC II

To install the Si3033 accelerator board from Siclone Sales, the plate holding the hard disk and floppy drive is lifted and the 68020 CPU (central processing unit) and the MMU (memory-management unit) chip are pulled from the Mac II and plugged onto the Si3033's adapter module, which then snaps onto the main logic board. The accelerator module containing the 68030 CPU, a 33.3MHz 68882 math coprocessor, and the 64K burst-mode instruction and data cache fits on top. Once the board is installed, you can run your Mac as either a 68020 or a 68030 machine.





these Work routines are small enough to fit in the M68030's own instruction cache. Also, the dramatic improvement in the Float benchmark times is due to DayStar's cache software, which allows you to bypass the Mac's SANE routines—especially the transcendental functions, which are all done in software—and directly access the M68882

**The IICI's enhanced  
performance can be attributed  
to higher clock rate,  
the choice of microprocessor,  
and an optional cache.**

floating point unit (FPU). The main effects of using external video are slightly worse times for the Draw benchmark and slightly better performance for the Launch and Recalc.

The overall results were about what you'd expect—as a general rule, systems with faster clock rates and/or caches had better times than those without. The major surprise was that the 50MHz 68030 accelerator in the Mac IIX (with a 32K cache) wasn't much faster than the 25MHz 68030 in the Mac IICI (with a 32K cache). In theory, the IIX should have been roughly twice as fast; in actuality, it was at most half again as fast in the Work benchmark and was actually slower in the Draw benchmark. This may be due to hardware factors such as NuBus transfer or ROM access time. The benchmark mix offers a suggestive rather than exhaustive indication of the performance of various configurations. Our tests show that the Macintosh IIX with the DayStar 50MHz 68030 board is about 30 percent faster overall than the Macintosh IICI.

## OBSERVATIONS AND ASSESSMENTS

Based on the benchmark figures and prices, the Macintosh IICI has a very competitive price-performance ratio compared to the rest of the Macintosh line

(see "Price versus Performance"). The price gap between a Mac IIX and a comparably equipped IICI is less than \$1000, with the IIX falling in between. This raises the question of why you might want to buy a Mac IIX in the first place. Unless you really need a 5.25-inch internal hard drive or more than three slots, there's no reason. And you can always boost the performance of the Mac IICI later by adding in a cache card.

What if you already own a Macintosh IIX? You have three choices. (1) You can content yourself with the current performance of the IIX. (2) You can wait for one of the as-yet-unreleased IIX accelerator boards. (Because the CPU chips in the newer IIX's are soldered to the main logic board rather than held by sockets, there may be a delay in the release of the accelerator boards.) (3) You can get the IICI logic board upgrade, which costs \$2400. This third option is probably your best bet, but the price seems a bit steep. The difference in list price between the two bare-bones systems (IIX and IICI) is only \$1600. Even given some of the modifications that must be made to the Mac IIX enclosure, it's not clear how Apple accounts for the other \$800.

What if you own a Macintosh IIX? Obviously, no logic board upgrade is available (unless and until Apple releases a compatible IIXi), so your only choice is to buy a third-party accelerator board. These are expensive, however, running anywhere from \$2400 to \$6000, and they may require you to replace existing RAM with higher-speed RAM, adding another \$400 to \$800 (less whatever you can get for your old RAM). The chances are you won't want a 40MHz or 50MHz board; the difference in performance between these boards and a 33MHz board is too small to justify the large jump in price, unless, of course, you really need the little extra performance. In that case, you might be better off buying a new Macintosh IICI. It'll cost a few thousand more, but you'll have two systems, not just one very expensive one.

Finally, what if you own the orphaned Macintosh II? Apple does offer a logic board upgrade to the Macintosh IIX level for \$2200, but for a few hundred more you

## WHAT'S THE CACHE?

A cache is an area of memory that can be directly accessed by the central processing unit (CPU) without the delays involved in reading from main memory. When the CPU fetches code or data, it leaves a copy (along with the address) in the cache. The next time the CPU does a fetch, it first checks to see if the code (or data) at that address is in the cache; if so, it reads directly from the cache. This may sound complicated, but the hardware performs the necessary storing and checking very quickly.

The M68020 and M68030 processors have small (256-byte) caches built into the chips themselves; the M68020 has a code cache, while the M68030 has both a code cache and a data cache. These caches account for some performance increase, but not a lot; they only keep track of 16 memory locations each—not enough to make a significant difference. Motorola has proposed expanding the cache on the announced M68040 processor to 1024 bytes.

The Macintosh IICI and many accelerator boards use a much larger, separate cache in order to boost performance. These caches typically contain 32K to 64K of high-speed static RAM. The Mac IICI provides the necessary supporting hardware; you just plug in the cache card. The accelerator boards come with a built-in cache.

can buy the DayStar 25MHz 68030 accelerator—obviously a better way to spend your money. (See "Is Your Mac Obsolete?" in this issue for more options.) And for about \$4400 (plus replacement RAM), you can get the Siclone 33/030 accelerator, which puts your Mac II at almost the same level of performance as the Macintosh IICI with a cache card. But again, you probably don't want a 50MHz accelerator for the reasons mentioned above.



## TIME TABLE

Shown in seconds\*

Configurations	Work	Float	Draw	Launch	Recalc
Stock Mac II	36.5	47.9	33.9/79.8	8.9	16.0
Mac II with Si3033	15.9	7.7	18.7/63.9	5.9	6.7
Stock Mac IIx	29.6	41.4	26.5/69.1	6.7	13.2
Mac IIx with DayStar 25/030	16.2	6.8	18.5/60.9	5.8	6.8
Mac IIx with Si3033	20.3	11.1	22.0/68.4	6.6	8.7
Mac IIx with DayStar 50/030	12.0	7.5	16.1/58.1	5.4	5.3
Stock Mac IIci	18.1/18.1	25.6/26.4	15.8/39.1	6.4/6.4	9.7/10.0
Mac IIci with DayStar cache	18.1/18.1	7.1/7.2	11.9/34.3	5.7/5.9	6.6/6.6
Mac IIci with video	18.1/18.1	27.4/27.5	18.2/50.5	5.0/5.8	9.6/9.6
Mac IIci with DayStar cache & video	18.1/18.1	7.2/7.2	15.2/46.7	4.8/5.6	6.5/6.4

\* When there are two figures, second figure represents the speed when in 8-bit mode.

To compare the performance of several configurations (Mac II, IIx, and IIci with and without a variety of accelerator boards and cache boards), I ran a series of timing tests using five simple benchmarks.

**Work** The sum of three benchmarks (Sieve, Matrix, Sort) that involve tight loops, array indexing, integer math, string comparison, and other basic operations.

**Float** The sum of two benchmarks (Ftest, Savage) that perform floating-point math and transcendental functions.

**Draw** The time it takes to draw 4000 rectangles and 1000 circles on the screen; run in both 1-bit and 8-bit mode on all systems.

**Launch** The time it takes to launch Microsoft Excel 2.2.

**Recalc** The time it takes to recalculate a large spreadsheet (1024 rows by 26 columns).

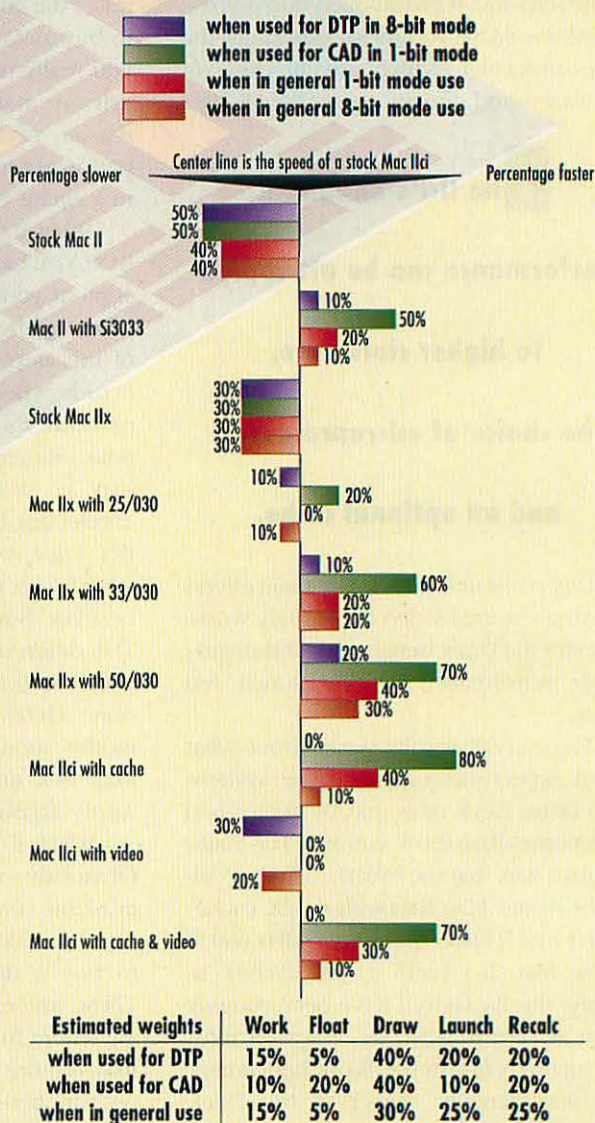
The figures in "Time Table" are intended to measure performance in a variety of areas, but they do not represent an exhaustive comparison.

To illustrate how overall performance may vary according to specific tasks, "Interpreted Advantage" is broken into three application areas: general use (word processing or databases, for example), computer-aided design (CAD), and desktop publishing (DTP). In each of the three application areas, weights were assigned to each of the five benchmarks according to an estimate of how much processing time each demands. For instance, I assumed that floating-point calculations take up four times as much processing time when working with CAD as they do when working with DTP or general applications.

The percentage values in "Interpreted Advantage" were determined by indexing the speeds for the various configurations against a stock IIci. (For example, because a Mac II takes twice as long to perform the Work test, its index number is 0.5.) For each application area,

## INTERPRETED ADVANTAGE

Shown as a percentage of the difference in speed from a stock Mac IIci



these indexes were then multiplied by their corresponding percentage weights. (The Mac II/Work index of 0.5 was multiplied by 15 percent for the DTP and general use scores and by 10 percent for the CAD scores.) The resultant values for each of the five test scores were added together and percentages calculated. (The final score for the Si3033 board for DTP applications on both the Mac II and the Mac IIx was 1.1, and the corresponding bars on the chart show that the test speeds were 10 percent higher than they were on a stock IIci.)

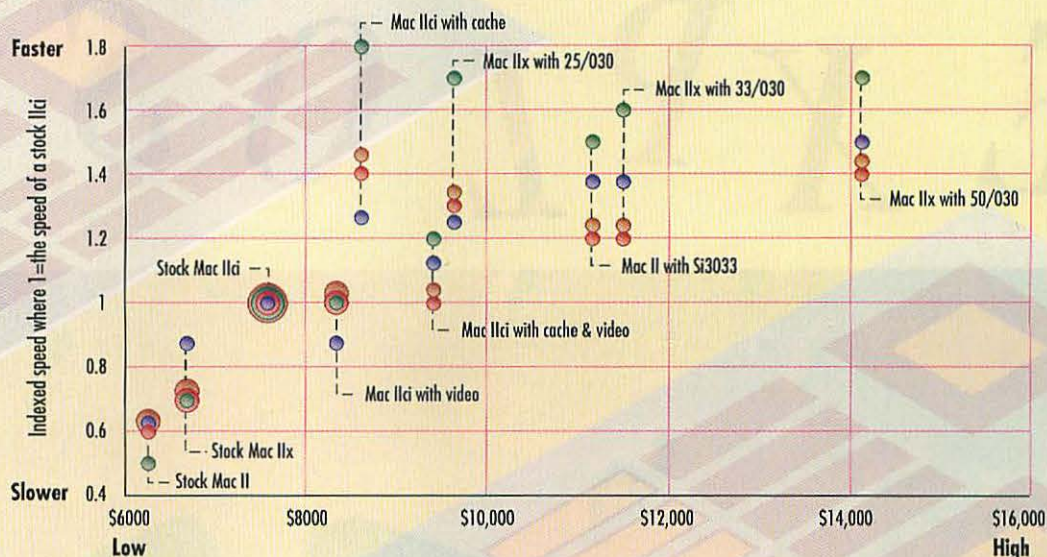
The results offer an indication of the overall relative performance for each system configuration for each application. While these weights do not represent a precise measurement of the actual instruction mix for these applications, they are intended to show that one system might be a better choice for specific applications.



# PRICE VERSUS PERFORMANCE

Shown as the indexed speed relative to a Mac IIci as a factor of price

- when used for DTP in 8-bit mode
- when used for CAD in 1-bit mode
- when in general 1-bit mode use
- when in general 8-bit mode use



The prices shown in "Price versus Performance" for Apple products are based on list prices for a Mac II and IIci with 1MB of RAM, and an AppleColor High-Resolution RGB Monitor. The assumed cost for upgrading the system to 4MB RAM at street prices is \$400. (Note that the official Apple list price for 4MB of RAM as of November 1989 is \$1999; it looks as though they're still trying to get rid of that high-priced RAM they bought back in 1988.) The Macintosh II 8-bit Display Video Card is priced at \$648. Accelerator board prices include 68882 coprocessors.

At press time, Daystar announced that it was shipping accelerator boards (25MHz, 33MHz, 40MHz, and 50MHz) for the Mac IIcx. Siclone and Total Systems hope to release their own boards for the IIcx in the first quarter of 1990. Shodan, a developer in Berkeley, California, is working on a IIci cache board.

Although we used the Siclone Si3033 and DayStar 25/030, 50/030, and IIci cache boards in our benchmarks, this does not imply a preference. Here is a list of vendors supplying accelerator boards:

● DayStar Digital 800/962-0277		● Dove Computer Corporation 919/763-7918	
DayStar 25/030	\$2395	MaraThon 030 (for II)	\$1599
w/68882	\$2995	MaraThon 030x (for IIx)	\$1599
DayStar 33/030	\$4095	68881 coprocessor	\$349
w/68882	\$4995	68882 coprocessor	\$499
DayStar 40/030	\$4995	● Siclone Sales and Engineering	
w/68882	\$5995	408/263-8207	
DayStar 50/030	\$5995	Si3033 (for II and IIx)	\$3995
w/68882	\$7395	w/68882	\$4995
(All above boards for the II, IIx, and IIcx)		● Total Systems	
DayStar IIci cache (32K)	\$995	503/345-7395	
		Voyager 030/33 (for II and IIx)	\$4195
		w/68882	\$5195

Better to spend your bucks on an entirely new system.

One other option you might consider is selling your current system and buying a Mac IIci. The feasibility of this course depends upon what you can get for your Mac. A Mac IIx system would probably bring in enough to make this course feasible—the difference between the selling price of your Mac IIx and the buying price of the IIci would most likely be less than the price of an accelerator board for the IIx. It's questionable whether or not this would be true for a Mac IIcx. You'd probably spend less for a logic board

upgrade. This route is not favorable if you own a Mac II.

In summary, if you really want or need the performance of a Macintosh IIci (or better), here are the best courses of action for owners of the Macintosh II, IIx, or IIcx:

- If you've got a Macintosh II, get a third-party 33MHz accelerator card.
- If you've got a Macintosh IIx, sell your IIx and buy a IIci.
- If you've got a Macintosh IIcx, get the logic board upgrade.
- If you don't have a high-end Macintosh, buy the Macintosh IIci.

Remember, however, that if you already own a Mac II, IIx, or IIcx, you've probably got all the computing power you need. Few tasks really require the computing power of the IIci. Spending money to gain speed in order to stay in the game is expensive. When someone ups the ante, it is sometimes best to stand pat. ■

See *Where to Buy* for contact information.

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**Bruce F. Webster** is a software engineer and Macworld contributing editor who recently moved to San Diego.



*Going Beyond Lino:* THE IMAGESETTER

# EXPLOSION





by Steve Roth

When PostScript first appeared on the Macintosh scene, the LaserWriter was the only printout option. It took more than a year before high-resolution PostScript imagesetters from Linotype—the Linotronic 100 and Linotronic 300—gave meaning to PostScript's device-independent design.

Linotype maintained its de facto monopoly on high-resolution PostScript output for more than two years, during which time, *going to Lino* became a generic term for Mac typesetting. But that monopoly has ended now, and there are lots of PostScript imagesetters available, with an amazing diversity in configurations, speeds, resolutions, and special features.

This wealth of refrigerator-size off-white boxes—20 at last count—is creating confusion among desktop publishers, service bureau proprietors, and anyone considering in-house imagesetting. Service bureaus and potential imagesetter owners trying to decide which machine to buy need to answer questions about speed, compatibility, upgradability, quality, and support (not to mention price).

Service bureau customers, while less affected, may still want to know about the available options. If you're sending out a job for four-color separation, for example, you might want to look around for a service with a device that uses non-PostScript halftoning techniques optimized for separations. The machines at some bureaus may not offer the fonts you need. Or you may get a better price and faster turnaround at a service with one of the faster and/or lower-resolution machines.

One of the good things about the new diversity in offerings is that it has brought diversity to pricing. The Japanese have yet to enter this market, so prices haven't really plummeted, but they are going down—and up. While the original Linotype 300s were priced around \$80,000, imagesetters are now available starting in the low \$30,000s—making in-house imagesetting more attractive to medium-size operations. There are also machines offering high quality and/or speed going all the way up to the mid-\$100,000s.

Despite their differences, the imagesetters covered here have one thing in common—they use photographic media (paper or film) for output. There are devices on the market that print at 1000 dots per inch or more on plain

paper, but all are based on toner—and are limited in the quality they can produce by the size of the toner particles (especially for tinted areas). Photographic media are for all intents and purposes unlimited in the resolution they can handle.

## POSTSCRIPT RIPs—OR DOES IT?

The thing that makes an imagesetter into a PostScript imagesetter is the PostScript *RIP*, or raster image processor (see "What Makes an Imagesetter"). A raster image is just a bitmap (in this case a big, high-resolution bitmap). What all the RIPs on the market do is eat PostScript page descriptions and spit out bitmaps, telling the marking engine what dots to put where. The heart of a PostScript RIP is the PostScript controller, a board or group of boards that does the actual processing, turning PostScript code into a pageful of dots. A RIP device also includes disk drives, a power supply, and interfaces that connect it to various computers and marking machines.

The heart of a PostScript controller is the PostScript interpreter—the software that reads the PostScript code and decides which dots should be black. The interpreter might be in ROM (read-only memory), as is the case with most Adobe implementations, or it might run as an application on a standard hardware platform (such as the Mac), as with the Hyphen interpreter. Or the setup might provide a combination of the two, as with the Rips interpreter on BirmySetters; the interpreter is in ROM, but it can be supplemented with software from disk—for instance to add support for a different output engine.

## ORIGINALS AND CLONES

Adobe invented PostScript, so the Adobe interpreter is, obviously, the standard in the PostScript imagesetter world. Even some of the makers of clone-based imagesetters freely acknowledge that Adobe's interpreter is the best around. Several viable PostScript clones have come to market, however, notably from Custom Applications, Inc. (CAI), Hyphen, and Rips (not to be confused with the generic acronym RIP). There are clones, though, and then there are clones. Customers have legitimate concerns about the clone-based RIPs.

**Compatibility** As with the IBM PC clones, which went through an adjustment period but eventually achieved true compatibility with IBM, the PostScript clones discussed here are now getting to the point where compatibility is a lesser concern. PostScript aficionados can usually break a clone pretty quickly if they try, but they can also break an Adobe-based imagesetter. So although the Adobe interpreters are still more reliable—especially with very large files containing scanned images—Post-

**"Going to Lino"  
used to be synonymous  
with sending  
files off for high-  
resolution Post-  
Script output. Now  
there are other  
places to go.**



Script from application programs doesn't hang up the clones very often.

Until recently, the clones have had trouble with Adobe typefaces (most clones come with Bitstream versions of the Mac Plus font set), but with Adobe's publication of its font specifications, the clone creators should quickly surmount that last crumbling barrier. Adobe has five years of experience behind it, which shows in its



**Spinning Wheels**  
*The Optronics Color-Setter uses a spinning drum and 20-by-26-inch sheets of paper or film, rather than a continuous-feed mechanism. This method allows for much tighter registration.*

clean implementations; but the clone developers and makers of clone-based RIPs are catching up fast.

**Speed** Ever since the clones first emerged, people have hoped that the imitators would be faster than the Adobe implementations. But believe it or not, the fast Adobe RIPs are among the fastest on the market (see "Imagesetter Time Trials"). The Hyphen interpreter running on Hyphen's dedicated controller is about the fastest around, and the new RIPS board, based on Intel's RISC chips, may give Hyphen a run for its money, but the fast Adobe-based RIPs are no slouches.

## POSTSCRIPT CONTROLLERS

The three primary sources of controllers for imagesetters are Hyphen, Rips, and of course, Adobe. Each of those companies has built its own interpreter into various hardware configurations. In some cases, another company (Birmy, for example) takes one of these three firms' controllers and builds it into a RIP.

**Adobe** doesn't actually build PostScript controllers. Sometimes it ports its interpreter to run on boards that a manufacturer has designed and built, but more often than not Adobe provides a complete board design for the manufacturer.

You may have heard about Adobe's Atlas and Atlas Plus controllers. According to Adobe, those monikers don't mean much; very different controllers can go by these same names. All the Adobe-designed controllers run on the same 68020 chip that drives the Mac II, at either 16.67MHz or 25MHz. Some of these controllers use coprocessors, though according to Adobe that doesn't make much difference in performance. The biggest difference between various RIPs using Adobe-designed boards is the amount of memory and disk space included: some RIPs have enough room to buffer a full page to disk and spool it out while the next page is being processed.

Manufacturers do modify Adobe designs, sometimes with significant performance improvements. The speedy RIP from Monotype is a good example.

Because of Adobe's licensing arrangements, Adobe-based RIPs don't drive different kinds of output devices, as some of the clone-based RIPs do. Some manufacturers offer multiplexers that let you achieve maximum efficiency by having multiple Adobe-based RIPs drive multiple imagesetting engines, but none of the Adobe-based RIPs will drive a laser printer, a color printer, and an imagesetter. Watch for more flexible Adobe-based offerings as the clones start making an impact on Adobe's market.

**Hyphen** offers its interpreter as an application running on the Macintosh (in which case the Mac's system board is the controller, and the Mac itself, with its disk drives and interfaces, is the RIP) or as a stand-alone hardware RIP. The hardware implementation stacks up as about the fastest RIP around, and it gets high points for compatibility. It uses proprietary halftoning techniques that Hyphen says improve the quality of halftones and separations. The Hyphen interpreter is also used in a number of prepress systems, running on a variety of hardware platforms (see "The Prepress Connection," *Macworld*, October 1989).

**Rips** provides controller boards based on Intel's RISC chips to a variety of manufacturers, including imagesetter vendors Birmy Graphics Corporation and Itek Graphix Composition Systems. Unlike

Hyphen, which actually builds and sells RIPs and complete imagesetter packages, Rips sells the controller boards, and the imagesetter vendors build their own RIPs around them.

**CAI** has a PostScript interpreter that runs as an application on either IBM PCs or Macs, and it's included in some laser printer controllers. While both Agfa Compugraphic and Optronics currently offer imagesetters based on the CAI interpreter, Compugraphic is also offering (and pushing) Adobe-based RIPs, and Optronics is moving to the Adobe interpreter.

## IMAGING ENGINES

In addition to the interpreter and the RIP, the other partner in any imagesetting configuration is the imaging engine, which actually puts dots on the photographic paper or film. Most of the engines use a laser to expose the photographic medium (the only exception discussed here is Itek, which uses an LED array). There are a number of important factors to consider when looking at imagesetting engines.

**Page Buffering** Whatever the exposure method, the marking engine needs to move the paper or film past the light source. If the RIP can't keep up with the marking engine, the engine has to stop, then restart when the controller catches up and begins sending dots again. This mechanical operation is one of the main sources of streaks, or artifacts, especially in flat tinted areas.

Even with the Linotronic 300, which backs up and gets up to speed again when restarting after a stop, artifacts can crop up. Several of the new RIPs buffer a whole page of dots to disk or memory before imaging the page, so the engine can run without stopping.

**Image Accuracy** Accuracy is another important consideration. Users of the old Linotronic 100, for instance, are familiar with variations of 1/8 inch or more from one end of a page to another—not such a problem with black-and-white pages, but crippling if you try to print color overlays and separations. Most of the new engines are accurate to within about 4 mils (thousandths of an inch) over their width, with some, notably the Optronics engine,



boasting accuracy to within 1/5 mil.

**Film Mechanism** Imagesetters handle film or photographic paper in one of two ways. They work either with spools of film, using supply and take-up reels, or with large sheets that wrap around a spinning drum. The sheetfed method is familiar to anyone who's seen a high-end prepress machine in action. This system provides for more accuracy and larger sizes, but it's slower because each sheet needs to be fed, mounted on the drum, imaged, and dismantled individually. Most imagesetters use spools of film; the primary exception is the Optronics Color-Setter 2000 (see "Spinning Wheels").

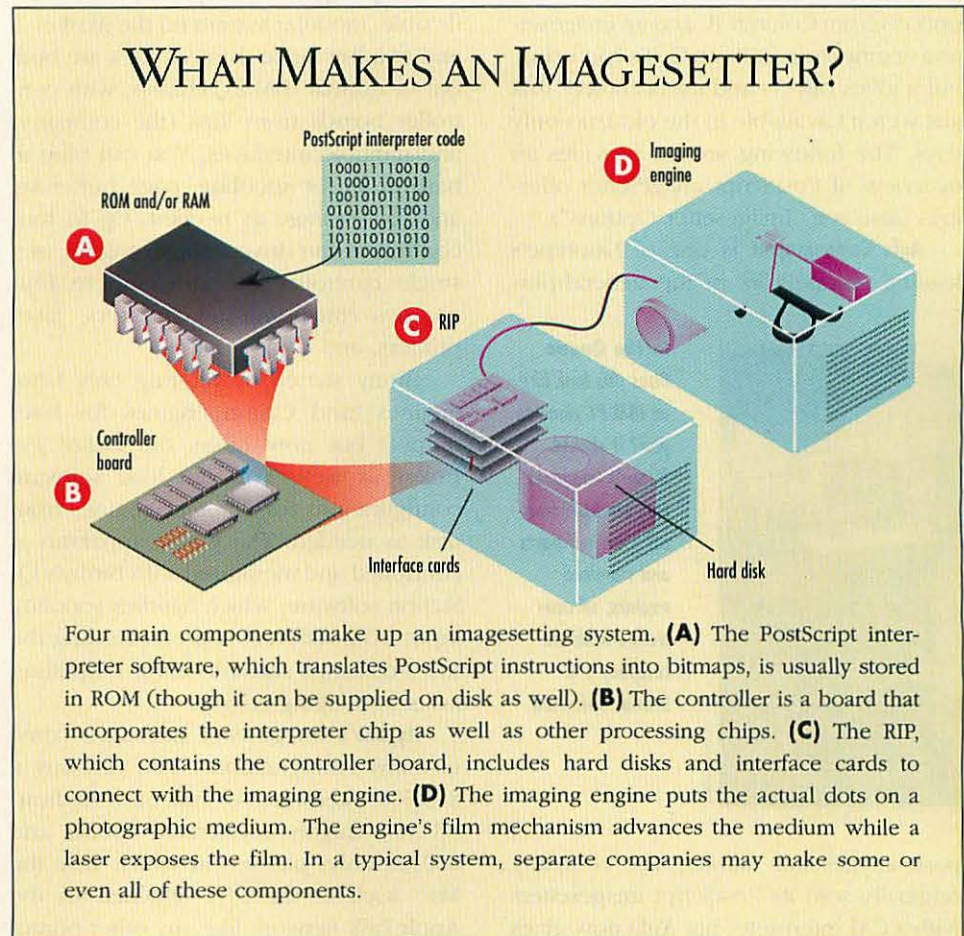
**Image Size** A key consideration for many users is the size of the image they can produce in one piece. Even if you're printing only 6-by-9-inch pages, which any of the imagesetters can handle, you can save a lot of money by printing the pages two-up. Engines are available now that go up to 18 inches, but bear in mind that in addition to physical limitations, image size can also be limited by the memory and disk capacity of the RIP.

**Imaging Speed** When printing simple pages of text and graphics, which the RIP should be able to blaze right through, imagesetter output is limited by the speed of the film-imaging mechanism. A fast imaging-mechanism makes a lot of difference when you're printing a 400-page book that's all text, or trying to get a newspaper out on deadline.

## OFF-THE-SHELF ENGINES

Probably the biggest change taking place in the imagesetter business is the move to the use of standard output engines. Just as with laser printers—where a manufacturer can develop a product by putting a Canon or Ricoh laser engine together with an Adobe PostScript controller—imagesetter manufacturers are combining engines from companies like ECRM and Ultratech with PostScript-compatible controllers. In some cases, yet a third company buys that combination and put its own name on it.

**ECRM** produces three engines in the Pel Box line—the 108, the 108S, and the 3000. The 3000 is a 12-inch-wide engine



with speeds varying from 10 inches per minute at 1016 dpi to 3.3 inches per minute at 3048 dpi. It's not very fast, but it has high resolution, and it's flexible.

The Pel Box 108 handles 18-inch-wide paper, running 11.8 inches per minute at a fixed 1016 dpi—less appropriate for halftones and inappropriate for color separations, but great for fast output of type and object graphics with limited tints. The 108S has the same specs as the 108, with double the imaging speed. Vendors using Pel Boxes in some products include Hyphen, Varityper, and Autologic.

**Ultratech** makes two Ultrasetter engines, with 12-inch and 15.7-inch widths. These engines have been praised for their quality, value, and versatility (they offer resolutions from 400 dpi up to 3000 dpi, and they can image on a variety of materials). Their imaging speed isn't great, though—only 1.8 inches per minute at 3000 dpi, and 4.4 inches per minute at 1200 dpi. Versions that double the imaging speed

are available for a premium, though their electronics have trouble keeping up with the data coming from the RIP at resolutions above 2000 dpi. PostScript imagesetters using the Ultratech engines are available from Birmy Graphics and Hyphen.

## WHAT'S OUT THERE

In most cases an imagesetting system consists of one controller and one engine. With some systems, though, you can link a controller to multiple output devices, so it can drive a laser printer, a color printer, and an imagesetter. Likewise, if a controller isn't fast enough to keep up with a speedy engine, it's possible with some systems to use multiple controllers to drive a single engine. To make things even more difficult, some manufacturers—Birmy Graphics and Hyphen, for instance—sell their imagesetters the way a Chinese restaurant offers dishes: you can choose an interpreter and processor



from Column A, a hard disk and memory options from Column B, and an imagesetting engine from Column C. It's confusing, but it gives buyers and users choices that just weren't available in the old Lino-only days. The following section provides an overview of PostScript imagesetter offerings (also see "Imagesetter Options").

**Agfa Compugraphic** is one of Linotype's leading competitors in the general-purpose



**In the Queue**  
Does this look like an IBM PC clone to you? It should. Birmy's imagesetters are built from off-the-shelf parts and standard engines, all controlled with the company's Q-Station software.

ROLAND BISHOP

pose imagesetter market. The company originally sold its PostScript imagesetters with a CAI interpreter but Agfa now gives you a choice between two Adobe-based RIPs—the PSTD and the PS MAX, which the company calls a Turbo Atlas Plus design (the CAI RIP is still an option, but Agfa isn't pushing it). The Agfa Compugraphic RIPs use an additional hard disk to buffer full pages, so the RIPs can be processing one job while another job is spooling out to the imaging engine.

**Autologic** uses engines from Bidco and ECRM coupled with an Adobe-based controller. All are roughly 1000-dpi resolution engines most appropriate for text output; Autologic touts these machines' speed and page size. The company offers an optional multiplexer that handles input from four RIPs (PostScript and non-PostScript) and outputs to eight imaging engines, allocating jobs as the engines are available. With the Autologic Graphics Integrator, users can rasterize PostScript jobs before printing, turning them into TIFF files that can be stored and later merged into pages created with non-PostScript systems.

**Birmy Graphics** offers perhaps the most flexible, modular system on the market—and at a low price. Birmy's RIPs are built out of normal IBM PC chassis, with controller boards from Rips (the company) and multiple interfaces. You can plug in hard disks for spooling, page buffering, and font storage as needed. Up to four controllers can drive a single engine, or a single controller can drive up to four engines (including imagesetters, laser printers, and color printers).

Birmy started by offering only Ultrate engines (and Canon engines for laser output) but now offers the ECRM Pel Boxes as well. You can load software configurations for different engines from disk as needed. The whole apparatus is controlled and monitored with Birmy's Q-Station software, which handles spooling input from different sources, feeding the RIP PostScript and allocating outputting tasks to imaging engines.

**Hyphen's** imagesetter packages come in many configurations. You can buy a \$13,500 interpreter to run on a dedicated Mac (highly accelerated 68020s and 68030s only, please), in which case the Mac itself is the RIP, attached to the AppleTalk network like any other printer (an interface is included to connect the Mac to the imaging engine).

Or, if the software option doesn't appeal to you, you can choose a stand-alone hardware RIP that clocks in as the fastest on the market. Whether you use the hardware or software RIP, you can drive either of the Ultrate engines, or any of the ECRM Pel Box line.

**Itek Graphix** has one offering, the IGX 7000PS, a 1600-dpi RIPS-based LED imagesetter. The LED design enables the 7000PS to achieve a footprint of only 14 inches by 24 inches, but the engine has to start and stop every 12 picas, no matter what the status of the RIP. The machine has a text mode as well as a tint mode, which runs the film at a third the speed. Because of the speed penalty in tint mode and the start-and-stop nature of the engine, the 7000PS is more suited to text-heavy jobs than to screened illustrations and separations.

**Linotype** is the old hand in the PostScript imagesetter business, with three

general-purpose, Adobe-based machines. The Linotronic 300 is the long-standing workhorse of the business, with average imaging speed, size, and price. The Linotronic 200 is an inexpensive offering with impressive specs—a good contender for in-house imagesetting. And the Linotronic 500 offers large film size and high speeds, at a price. Linotype no longer makes the Linotronic 100.

**Monotype** offers fast imagesetters at relatively low prices. Its 24-inch-per-minute Express 100 has a faster imaging speed than any of its competitors, and there's even a 30-inch-per-minute version. All the Monotype imagesetters are driven by an Adobe-based controller that the company calls a Super Atlas. Monotype isn't saying what hardware modifications it has made to the normal Adobe design, but the Monotype imagesetters' performance in the Seybold time trials testifies that the company has done something (see "Imagesetter Time Trials").

You can add a second RIP to any of the Monotype imagesetters, if necessary, and Monotype's Laserplex, due out in the first quarter of 1990, will enable up to four RIPs to drive up to 16 engines (though three or four RIPs and 2 engines would be more typical).

**Optronics** is going after the high-end color separation and prepress market with its ColorSetter 2000, a spinning-drum, sheetfed imagesetter with accuracy to within less than a mil. It includes a built-in, UNIX-based computer and dedicated boards devoted to handling Optronics' proprietary halftoning techniques.

Optronics currently offers the CAI PostScript interpreter, but has announced a licensing agreement with Adobe. In either case, the Optronics machine bypasses PostScript's halftoning algorithms in favor of custom screening techniques the company says equal or surpass those available on high-end prepress systems.

**Varietyper** has two lines of imagesetters—the 4000 series, which uses Adobe-based RIPs, and the 5000 series, which uses a CAI-based RIP from Tegra (Varietyper's parent company). The Adobe RIPs are of the standard one-engine, one-RIP variety, but the 5000 series RIP can drive several different devices, including laser



# IMAGESetter TIME TRIALS

Measured in minutes:seconds

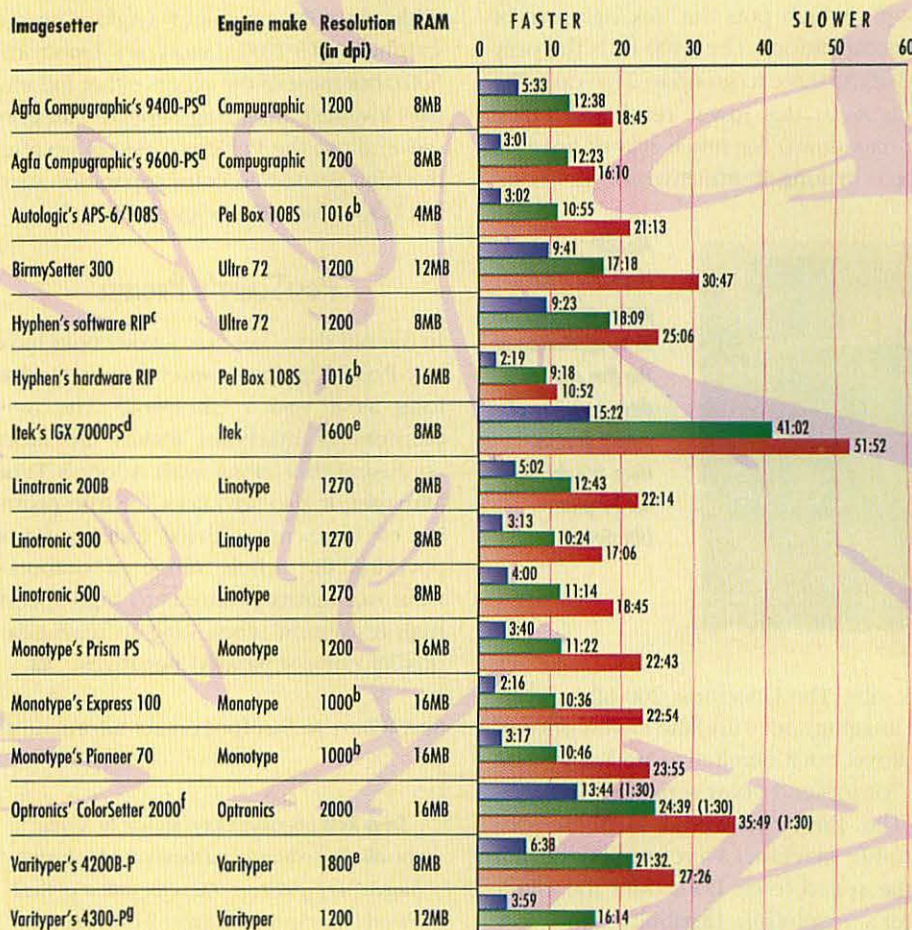
So which is the fastest PostScript imagesetter? You guessed it: it depends—on the kind of jobs you do, the number of jobs you do, and the kind of resolution you need. There are some clear leaders, though. This chart is based on tests conducted by the *Seybold Report on Publishing Systems* in its September 11, 1989, issue.

**Text Test** The first test is a 3-page, straight-text newsletter, with an average number of font changes and a few black boxes marking photo positions. It is representative of average-complexity desktop publishing jobs, though you could argue that it's a bit light on font changes, so it doesn't fully exercise the RIP's ability to build and cache font bitmaps—a key ability in design studios and service bureaus. Since this test is not computation intensive and includes multiple pages, the higher-speed engines fare somewhat better.

**Scanned Images** The second job is the same, but with an Illustrator file and a whole pile of gray-scale scans thrown in to push the imagesetters' memory limits and halftoning abilities. Film speed still counts, but the RIP is more of a factor here.

**FreeHand Separation** The four-color Aldus FreeHand file used in this test includes gradational fills, clipped areas, and type rotated at various angles. Separating it is a computation-intensive job that puts almost all the load on the RIP.

In selecting from the *Seybold Report's* test



<sup>a</sup>MAX controller. <sup>b</sup>Note lower resolution. <sup>c</sup>Running on Mac II with 33MHz Siclone accelerator. <sup>d</sup>First test run in text mode; others in tint mode. <sup>e</sup>Note higher resolution. <sup>f</sup>Tests normalized for sheet feeding. Numbers in parentheses allow for film mounting and dismounting. <sup>g</sup>FreeHand test not run.

data, I tried to standardize on 1200-dpi output where possible, since resolution has the greatest bearing on processing speed.

With imagesetters that did not offer 1200-dpi resolution, I chose tests at the closest resolution available.

printers, high-resolution plain-paper devices, and ECRM Pel Boxes. The 4000 line is getting a lot of attention as a Lino alternative; it offers excellent imaging speed, high resolution, and low price, but without the option for wider film.

## CHOOSING

Since everyone's needs and budgets are different, it's impossible to simply single

out the best imagesetter in this bunch. I've tried, however, to at least sort through the significant differences between packages in three price ranges. In addition to the features listed in "Imagesetter Options," be sure to take into consideration things like warranties and service contracts before you buy.

**Under \$40,000** In this lower price class, there are three Adobe-based contenders worth mentioning and two compatibles.

The Adobe-based machines are Linotype's Linotronic 200, Varityper's 4200B-P, and Agfa Compugraphic's CG 9400-PS MAX. In the compatible camp, there's the Birmy-Setter 300, which uses a Rips interpreter, and the Hyphen software RIP with the UlteSetter 72.

The Adobe-based packages performed comparably in Seybold's speed tests, but the 9400 was tested with a PS MAX RIP (an option that puts it out of the \$40,000



range), and comparing the Varityper's 1800-dpi performance against the others' at 1200 dpi isn't really fair (the Varityper did beat the 1600-dpi Rips-based Itek, though, which puts the Itek right out of the competition). The 9400-PS is the only one of the three to go up to 2400 dpi. The Varityper trades lower resolution (1800 dpi maximum) for much higher imaging speed, making it attractive for less com-

### MacRIP

Hyphen's interpreter can run as an application on the Mac and can drive a variety of output devices. Here, it's driving the 72-pica UlitreSetter.



plex jobs. The Linotronic 200 offers average imaging speed and the lowest price of the three, but it's limited to 1693 dpi—a bit shy for top-end color separations.

The BirmySetter and Hyphen software-RIP machines were roundly beaten in the speed tests. Both offer the UlitreSetter's resolution flexibility (and low speed), but the BirmySetter will also drive laser printers and color printers (you can save a lot of money right there). And it's the only under-\$40,000 machine that lets you add controllers and drives for parallel processing.

**\$40,000–\$80,000** The field's a lot more crowded in the midrange of imagesetters, but Varityper's 4300-P stands out based on its specs (high resolution and imaging speed, low price). Monotype's Prism PS TD and Pioneer 70 and Agfa Compugraphic's CG 9600 all outperformed the 4300-P in the time tests, though, and the Prism-PS TD and 9600 offer resolutions equivalent to that of the Varityper, so they may be better choices if you have complex work to do. There's also the opportunity in this price range to jump to a 15.7-inch film width with the BirmySetter 400 (Rips-based), or up to 18 inches using the CG-9700 or the Varityper 5000 series (CAI-

based) RIP with an ECRM Pel Box 108.

**\$80,000 and up** When you get into the stratosphere, the machines become more specialized. There are general-purpose, wide-measure machines (Agfa Compugraphic's CG-9700, Linotype's Linotronic 500), but most of the others either fall into the low-resolution/high-speed category (several use the Pel Box 108S) or go after the high-resolution color separation market (Optonics' ColorSetter 2000).

## PostScript's Promise

In the old days (last year), you could have any PostScript imagesetter you wanted as long as it was a Linotronic. The new plethora of machines makes life more confusing, but along with Adobe's Type Manager, it also advances the true promise of PostScript: device independence covering the whole range of output—from dot matrix printouts to high-speed, high-resolution typesetting to magazine-quality color-separated negatives. **M**

See *Where to Buy* for contact information.

.....  
**Steve Roth** operates Open House in Seattle, producing editorial packages for book and magazine publishers. He is the editor of *Real World PostScript* (Addison-Wesley, 1988).

<sup>1</sup> Since items like imagesetters are often highly customizable, it's not possible to present a complete list of possible options. The packages shown are standard offerings. <sup>2</sup> Standard configuration. <sup>3</sup> L = LocalTalk; S = RS-232 Serial; P = Centronics parallel; E = Ethernet. <sup>4</sup> Add \$7,000 for PS MAX RIP. <sup>5</sup> 8MB with PS Max RIP. <sup>6</sup> Ethernet optional. <sup>7</sup> \$94,800 with lower-speed ECRM Pel Box 108. <sup>8</sup> Horizontal resolution set with crystals; vertical set electronically. <sup>9</sup> High-speed option doubles 1200-dpi and 2400-dpi speeds. <sup>10</sup> Plus 40MB drive for spooling incoming jobs. <sup>11</sup> Additional resolutions available with custom crystals.

<sup>12</sup> Note that these are example configurations. <sup>13</sup> Includes approximate price of monochrome, 8MB Mac IIcx with 330MB hard disk, and Hyphen's \$3500 price for Sidone 33MHz accelerator. <sup>14</sup> Add \$13,000 to substitute 94-pica Ulitre, \$35,500 for Pel Box 3000, \$57,500 for ECRM Pel Box 108S. <sup>15</sup> High-speed option doubles speed for resolutions under 2000. <sup>16</sup> Optional. <sup>17</sup> Add \$31,000 to substitute ECRM Pel Box 108S; UlitreSetters' low imaging speed makes them less appropriate to the fast hardware RIP. <sup>18</sup> Speeds in Text mode.

<sup>19</sup> Add \$25,000 for second RIP added to any of these. <sup>20</sup> An 18-inch width available for \$10,000 additional. <sup>21</sup> A 30-inch-per-minute version is available.

<sup>22</sup> Optional \$12,000 board allows four separations with different screens on a single sheet. <sup>23</sup> Optonics has announced a licensing agreement with Adobe.

<sup>24</sup> Available with ECRM Pel Box 108 for \$10,000 more.

## IMAGESetter OPTIONS<sup>1</sup>

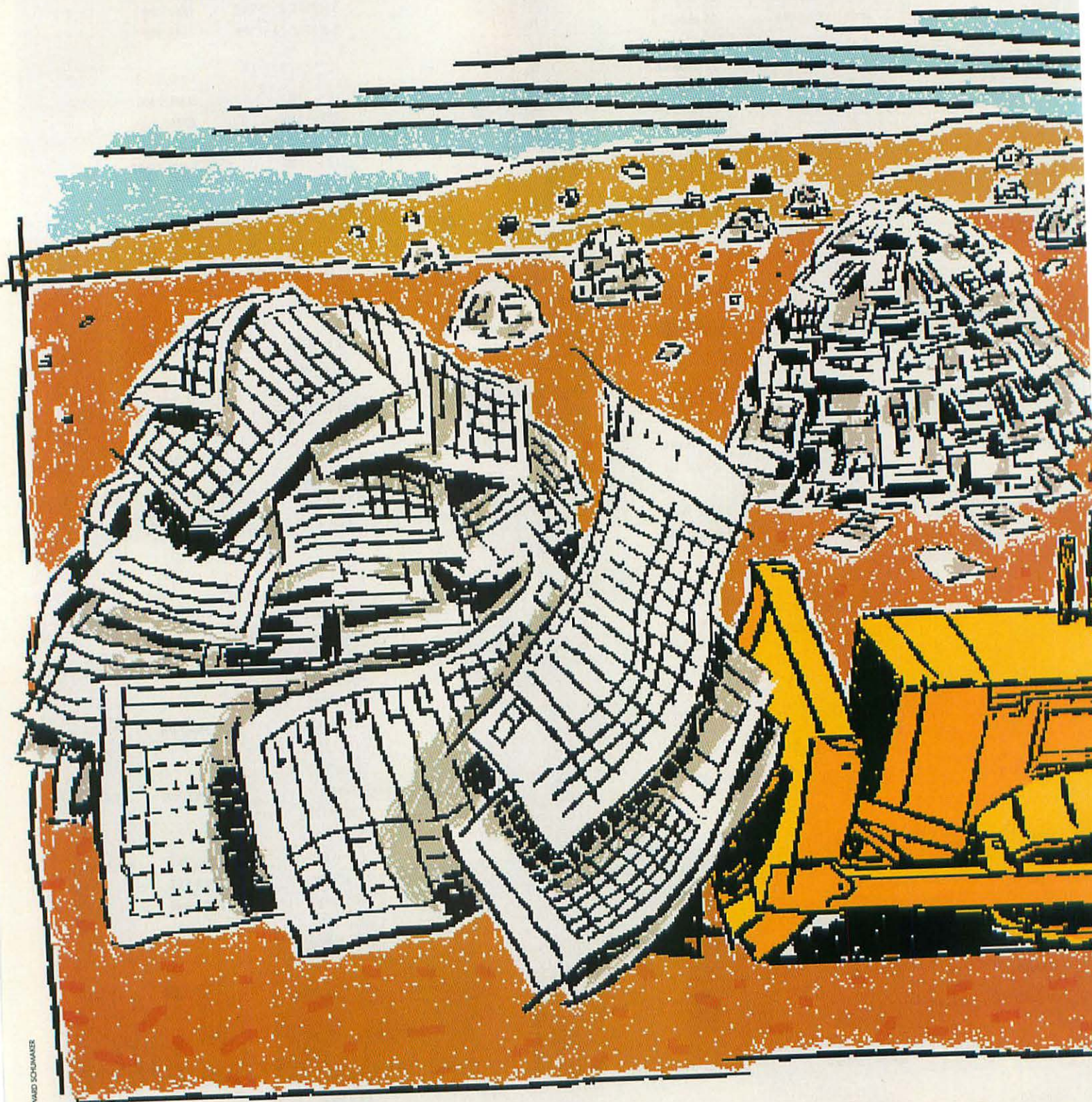
	Price	Resolution Setting (in dpi)
<b>AGFA COMPUGRAPHIC</b>		
CG 9400-PSD	\$38,000 <sup>4</sup>	1200, 2400
CG 9600-PSD	\$61,000 <sup>4</sup>	1200, 2400
CG 9700-PSD	\$79,600 <sup>4</sup>	1200, 2400
<b>AUTOLOGIC</b>		
APS-PS-PIP-W/670S	\$60,000	1016
APS-PS-PIP-W/680	\$118,500	1000
APS-PS-PIP-W/108S	\$107,000 <sup>7</sup>	1016
<b>BIRMY GRAPHICS</b>		
BirmySetter 300	\$34,600	400, 480, 600, 800, 1016, 1200, 1270, 1600, 2032, 2400, 2540, 3000 <sup>7</sup>
BirmySetter 400	\$49,000	400, 480, 600, 800, 1016, 1200, 1270, 1600, 2032, 2400, 2540, 3000 <sup>11</sup>
300TXF	\$61,900	1016, 2032 or 1270, 2540 or 1524, 3048
500TXF	\$109,000	1016
<b>HYPHEN<sup>12</sup></b>		
Software RIP with 72-pica UlitreSetter	\$38,000 <sup>13</sup>	480, 600, 800, 1000, 1200, 1600, 2400, 3000
Hardware RIP with Pel Box 3000	\$89,000	1016, 2032 or 1270, 2540 or 1524, 3048
<b>ITEK</b>		
IGX 7000PS	\$34,995	800 x 1600, 1600
<b>LINOTYPE</b>		
Linotronic 200B	\$30,000–\$35,000	635, 846, 1270, 1693
Linotronic 300	\$55,000–\$65,000	635, 1270, 2309, 2540
Linotronic 500	\$75,000–\$85,000	423, 635, 846, 1270, 1693
<b>MONOTYPE<sup>14</sup></b>		
Express 100	\$89,500	1000
Pioneer 70PS	\$79,500	1000, 1500
Prism PS	\$39,500	600, 1200, 2400
<b>OPTRONICS</b>		
ColorSetter 2000	\$125,000 <sup>22</sup>	2000
<b>VARITYPER</b>		
4200B-P	\$34,995	900, 1800
4300-P	\$53,995	1200, 2400
5330	\$65,945	1016, 2032 or 1270, 2540 or 1524, 3048



Engine	PS Interpreter/RIP	Included fonts/ Prints Adobe Fonts	Page Buffer	Film width (in inches)	Imaging speed (in inches/min. at dpi)	Disk size <sup>2</sup> / Memory	Interfaces <sup>3</sup>
Compugraphic	Adobe/Compugraphic	35 Adobe/Yes	Yes	13	2.5 at 1200, 1.25 at 2400	40MB/4MB <sup>5</sup>	L, S, P, E
Compugraphic	Adobe/Compugraphic	35 Adobe/Yes	Yes	13	5 at 1200, 2.5 at 2400	40MB/4MB <sup>5</sup>	L, S, P, E
Compugraphic	Adobe/Compugraphic	35 Adobe/Yes	Yes	18	5 at 1200, 2.5 at 2400	40MB/4MB <sup>5</sup>	L, S, P, E
ECRM Pel Box 3000	Adobe/Autologic	35 Adobe/Yes	Yes	12	10 at 1016	80MB/12MB	L, S, P <sup>4</sup>
Bidco 80/S	Adobe/Autologic	35 Adobe/Yes	Yes	13.3	18 at 1000	80MB/12MB	L, S, P <sup>4</sup>
ECRM Pel Box 1085	Adobe/Autologic	35 Adobe/Yes	Yes	18	23.6 at 1016	80MB/12MB	L, S, P <sup>4</sup>
Ultras 72	Rips/Birmy	35 Bitstream/Yes	Yes	12	4.4 at 1200 <sup>8</sup> 2.2 at 2400 1.8 at 3000	330MB <sup>10</sup> /8MB	L, S, P <sup>4</sup>
Ultras 94	Rips/Birmy	35 Bitstream/Yes	Yes	15.7	4.4 at 1200 <sup>8</sup> 2.2 at 2400 1.8 at 3000	330MB <sup>10</sup> /8MB	L, S, P <sup>4</sup>
ECRM Pel Box 3000	Rips/Birmy	35 Bitstream/Yes	Yes	12	10 at 1016 3.3 at 3048	2x200 <sup>10</sup> /20MB	L, S, P <sup>4</sup>
ECRM Pel Box 1085	Rips/Birmy	35 Bitstream/Yes	Yes	18	23.6 at 1016	2x200 <sup>10</sup> /52MB	L, S, P <sup>4</sup>
Ultras 72 <sup>14</sup>	Hyphen/Mac	35 Bitstream or Monotype/Yes	Yes <sup>16</sup>	12	4.4 at 1200 <sup>15</sup> 2.2 at 2400 1.8 at 3000	330MB/8MB	L
ECRM Pel Box 3000 <sup>16</sup>	Hyphen/Hyphen	35 Bitstream or Monotype/Yes	Yes <sup>16</sup>	12	10 at 1016 3.3 at 3048	155MB/16MB	L, S, E
Itek	Rips/Itek	35 Bitstream/Yes	Yes	13.5	14 at 800 x 1600 8 at 1600 <sup>17</sup>	91MB/8MB	L, S, P <sup>4</sup>
Linotype	Adobe/Linotype	13 Adobe/Yes	No	12	11.6 at 8467 5.8 at 1693 .8 at 1270	80MB/4MB	L, S, P
Linotype	Adobe/Linotype	13 Adobe/Yes	No	12	13.8 at 1270 4.2 at 2309 3.4 at 2540	135MB/8MB	L, S, P <sup>4</sup>
Linotype	Adobe/Linotype	13 Adobe/Yes	No	18	24 at 84 10.6 at 1270 5.9 at 1693	135MB/8MB	L, S, P <sup>4</sup>
Monotype	Adobe/Monotype	43 Adobe and Monotype/Yes	No	16.6 <sup>28</sup>	24 <sup>21</sup> at 1000	80MB/8MB	L, S, P
Monotype	Adobe/Monotype	43 Adobe and Monotype/Yes	No	11.7	15 at 1000	80MB/8MB	L, S, P
Monotype	Adobe/Monotype	43 Adobe and Monotype/Yes	No	11.7	12.5 at 1200 10 at 1500 6.25 at 2400	80MB/8MB	L, S, P
Optonics	CAI/Optonics <sup>23</sup>	35 Bitstream/No	Yes	20 x 26	2.1 minutes/sheet	556MB/16MB	L, S, P, E
Varityper	Adobe/Varityper	35 Adobe/Yes	Yes	11.7	26.6 at 900 13.3 at 1800	91MB/8MB	L, S, P
Varityper	Adobe/Varityper	35 Adobe/Yes	Yes	11.7	20 at 1200 10 at 2400	91MB/8MB	L, S, P
ECRM Pel Box 3000 <sup>24</sup>	CAI/Varityper	35 Bitstream/No	No	12	10 at 1016 3.3 at 3048	20MB/4MB	L, S, P



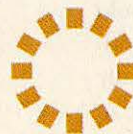
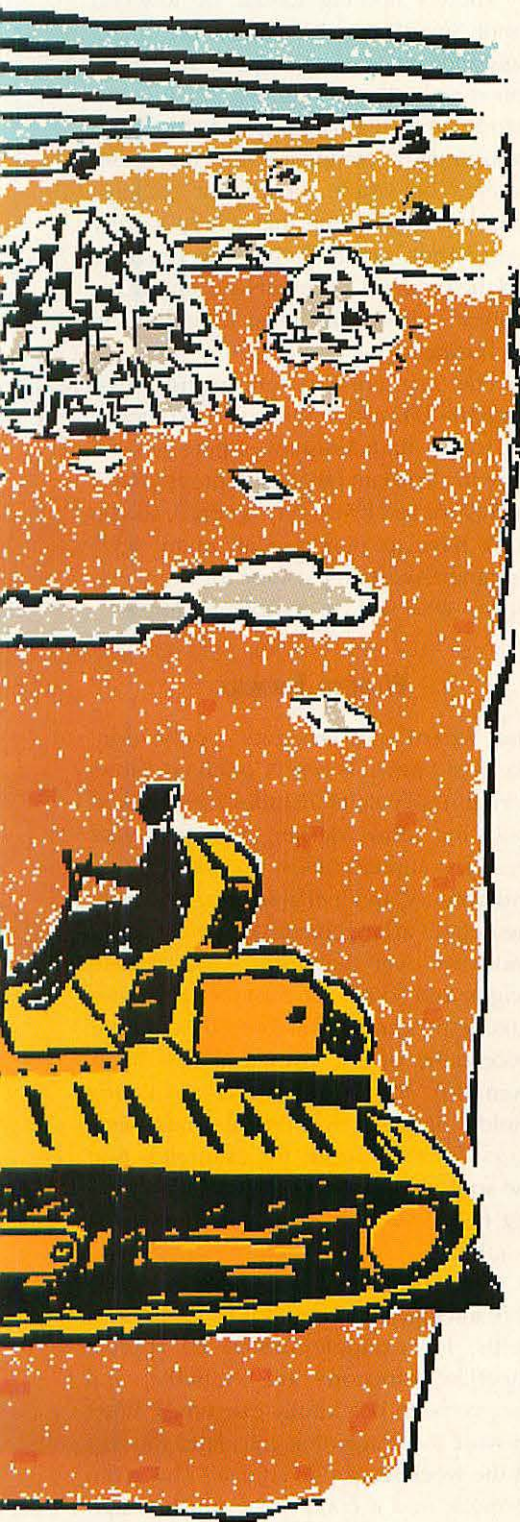
# *F o r m i n g*



WARD SCHUMAKER



# O p i n i o n s



**f**or years

*forms processing  
software has  
promised to take  
the pain out of  
paper pushing.  
How well does  
the current crop  
of programs  
deliver on this  
pledge?*

Name, weight, sex, marital status . . . from the moment you're born, your most personal statistics and public acts are recorded on a form. Every check you write, bill you receive, or TV listing you consult is a form; you can't buy or sell, hire or fire, create or destroy without filling one out.

Little wonder, then, that computer-aided forms processing software is already a \$116 million industry, according to one research firm.

Lured by these high stakes, some of the Mac's biggest software names have entered the marketplace. These companies all sing the praises of electronic forms processing: forms can be designed more precisely, filled out more uniformly, and stored more conveniently than ever before. For even medium-size companies, who may use hundreds or thousands of forms, the potential savings of

switching to electronic forms processing is considerable.

Yet the definition of forms processing is by no means clear. A forms designer for a Fortune 500 company may be most interested in using a computer to design a new form, which will then be reproduced

in traditional ways and filled out by hand. A census taker is probably looking for a method of translating handwritten responses on preprinted forms into electronic data. And a tax preparer's idea of forms processing probably includes designing, completing, and storing forms electronically.

No two competitors in the current forms-software market play the same roles in this equation, and none provide an ideal solution for everyone. Each package is designed to computerize only certain phases of a form's life cycle.



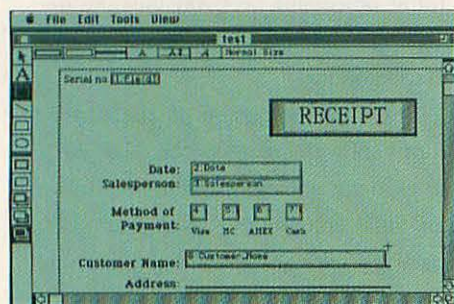
## FAST FORMS

At the low end of the available forms programs is Fast Forms, a \$150 forms-design program with rudimentary fill-in capabilities. A professional forms designer would probably sniff at Fast Forms' quick-and-dirty approach; the program is essentially a stripped-down MacDraw clone with an added data field—creation capability. Once you've created a form and defined the data fields, you can use the accompanying desk accessory to enter data into those fields or print out a blank form. You can also export data to a text file, one filled-in form at a time, for subsequent importing to a database.

There's no questioning the simplicity of Fast Forms in concept and execution. There is some question, however, as to the program's suitability for professional use. Other forms packages have a field tool that enables you to generate a fully formed data field—complete with label, border, and data-entry area—with one drag of the cursor. But in Fast Forms, you must first create a box using the rectangle tool, then add a label with the text tool, and finally place the field itself inside the box (by eye, yet) with the field tool—three tasks where one should do.

Fast Forms has other limitations, too: each form can only be a single page long; the page size can't be modified once you've begun to design the form; and only one font, size, and style may be present in a text block. Perhaps most disappointing of all is that Fast Forms can't save a completed form. You can export the data for the single form you've just filled in. But you can never again call up that completed form.

Fast Forms does show bursts of bril-



**i'm still using  
PageMaker to design  
forms. The forms-design  
packages out there can't  
provide the subtle design  
elements that help the  
user follow or read the  
form. Sure, they provide  
all these easy-to-use, spe-  
cialized tools. But if  
you're a professional  
forms designer, they put  
nothing but restrictions on  
your creative ability.**

*Lisa Burton, certified forms  
consultant, Graphic Systems West,  
Ventura, California*

liance. Each form, for example, has two transparent layers—one for the graphics portion of the form and one for the data fields. The advantage, of course, is that you can print the data onto preprinted forms (and suppress the printing of the lines and rectangles), or you can print a blank form with no data in it. And Fast Forms does allow you to create simple calculating fields (+, -, \*, and /).

Nevertheless, if you only want to design forms (and you don't need to fill them out electronically), you'd probably be better off with a true graphics program like SuperPaint. And if you want to fill out your forms and send the data to a database, you may as well buy a true database program with equivalent graphics capabilities. Data-base, for example, is less expensive than

**Fielding Questions**  
*Fast Forms is simple to use,  
but very limited in its  
capabilities. To create the  
Customer Name blank, you  
must use one tool to create  
the label Customer Name, a  
second to create the  
underline, and a third to  
create the field itself.*

Fast Forms and is not only a desk accessory but also a full-fledged database with searching, sorting, selecting, view-by-list, and even telephone-dialing capabilities.

## SMARTFORM

Where Fast Forms addresses only the design phase of forms processing, Claris's SmartForm tries to put together two links in the forms processing chain—electronic design and data entry.

There's nothing casual or low-end about SmartForm. It's almost breathtakingly elegant in every aspect. Its operation is smooth and intuitive. Menu commands and dialog boxes have been painstakingly composed for maximum clarity. The whole SmartForm package gives you the feeling that you're in very good hands. Online help is everywhere, and the program's manuals are among the gentlest, wisest, and most thoughtful in the business.

The SmartForm system includes two programs: Designer, where you compose the forms, and Assistant, where you fill them in. You can buy Assistant separately for \$49 (or less if you buy several), so you don't have to purchase an entire \$395 Designer/Assistant package for every employee who will be completing forms.

### WINNING FORMULA

The SmartForm Designer application, like Fast Forms, is object oriented. However, its tool palette includes some special tools for forms design. The field tool creates complete fields, including labels and borders, and it enables you to specify the default arrangement you prefer (label under or over the field, standard field height, and so on). The list tool generates tables (the standard quantity/description/price table on an invoice is the classic example). It's a snap to create *combs* (fields divided by vertical lines—one space for each letter, for example). And the special field tool creates self-completing fields, such as time, date, and page number.

SmartForm fields can have considerable intelligence. They can be calculation fields, for example (about 80 spreadsheetlike functions are available, and they've been beautifully executed). Want to write a formula that calculates the day of the week from a given date? This is the formula, and it couldn't be much easier:



## Get DayOfWeek(March 9, 1990)

SmartForm fields can also interact with the person filling out the fields. You can set up a field to display an error or help message ("Sorry, you must enter the full phone number, including the area code"). You can provide either an exhaustive or suggested list of possible values for a particular field.

The data entry portion of the SmartForm system, Assistant, even has some rudimentary database capabilities. You can save the completed forms into a FormSet, much like the records in a database file, and Assistant can perform searching and selecting functions on the set. You can easily print only those forms whose data meet certain criteria, for example. And SmartForm provides a thoroughly thought out export function so that you can send the FormSet data to a text file, which you can import into a database. While this routine suffices to get your data into a database, it's no substitute for either a direct link to a database or database functions within the program.

## AND YET . . .

If SmartForm is easy to use, elegantly designed, and superbly documented, why are many professional forms designers still using page-layout programs? In general, they feel frustrated by SmartForm's inability to handle unusual challenges. In a comb field, for example, it's not uncommon for the vertical lines of the comb to vary in length—a long line between the area code and number, and short lines between digits, for example. In a table, the designer may want the line between the headings Quantity and Description to be slightly thicker than the other lines. In a text block, different clauses may need slightly different letter kerning. SmartForm is incapable of handling these not-so-exceptional situations.

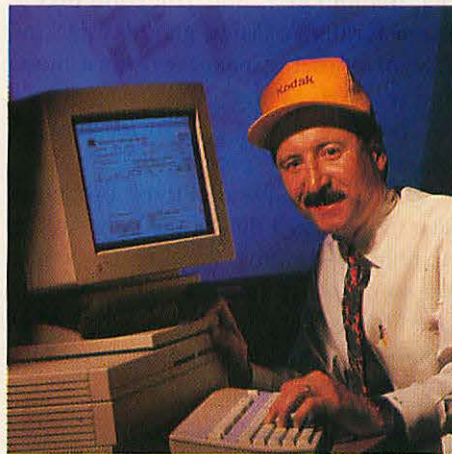
In other words, SmartForm's tools are convenient but canned. You couldn't, for instance, use SmartForm to reproduce an existing form exactly—a serious drawback for many forms users. The program is superb for creating new forms that don't need to comply with any existing style guidelines. But it's simply not capable of

meeting the exacting specifications of professional forms designers.

## TRUEFORM

There's a third major player in the forms processing market: TrueForm. This \$395 program addresses yet another phase of forms processing—the exact reproduction of existing forms, using a scanner.

You cannot design a form with TrueForm. It has no graphics tools whatsoever. You can't add a rule, type in a heading, or add shading. Instead, you must either scan an existing form or create one in a graphics or page-layout program—an approach that's both brilliant and infuriating. Brilliant, because you don't spend time learning to use a new program for designing your forms (if you're a designer, you're probably already familiar with a page-layout or graphics program). Infuriating, because you can't modify a form layout with TrueForm. You must go back to your graphics program and reimport the graphic image (and then drag the fields into their new positions).



MICHAEL GREENIAR

ITEM	QUANTITY	PRICE
Sample text	1430	\$1,045.00
Sample text		
Sample text		
Sample text		
Sample text		

And scanning isn't a complete solution, either. Trying to scan a form into TrueForm with perfect alignment can raise your blood pressure. And that isn't necessarily because the form isn't positioned correctly in the scanner. Very often, the existing form wasn't printed straight to begin with. Furthermore, the scanned forms wind up being huge in terms of disk space (about 1MB per page); even with TrueForm's scan-compression option (which works only for some scanners), each page can consume 400K or more.

You'll pay for that size when you try to print, too—one scanned page can take ten minutes to print on a laser printer. TrueForm's caching feature assures that additional copies of the same form will print out far faster. But the time it takes to print the first one shatters one of the great hopes for electronic forms processing, the principle of forms on demand.

## HABIT FORMING

If you can't design a form, what's TrueForm good for? It turns out, it's very good for certain applications. Once the form image is imported—from either a scanner or a graphics program—you add data fields to the image simply by clicking in the appropriate spots. TrueForm has the brains to search from the location of your click for the nearest field boundaries.

*"The Macs were brought into Kodak the same way they were in other industries—by tooth and claw," says Mike Krol, manager of computer information and assistance at Eastman Kodak in Rochester, New York. "What made it especially appealing is that we bought a site license agreement for SmartForm Assistant. That gives us the right to distribute 100 copies of it throughout our business unit. The response has been overwhelming; people just love it."*

## Pretty Smart

Here are some of SmartForm's most helpful features at work. There's a self-numbering, combed numeric field (upper right), a Specs window that lets you specify exact dimensions of any element of the form (lower right), and a table created automatically with the table tool (lower left). The Show Sample Data feature is turned on; SmartForm fills in all the blanks with sample data so you can get an idea of how the form will look.



When it finds them, it inserts a fully formed field. So you're spared the tedium of dragging fields into position—TrueForm handles sizing and positioning issues for you.


Once the fields are in place, you can give them the same kinds of intelligence as you can with SmartForm. You can define math functions, field names, error and help messages, choice lists, and so on. Using the fill-in application (sold, like SmartForm Assistant, separately and inexpensively), you can save the completed forms into database-like sets, just as you can with SmartForm.

TrueForm is much more harrowing to work with than SmartForm, however. The manual has no tutorial, and it's scattershot and disorganized. The calculated-field language is unnecessarily complex. Worst of all, there's no Undo command—inexcusable in a graphics-based program.

Still, some companies swear by TrueForm. Its extensive hooks to the 4th Dimension relational database, for example, overcome the biggest drawback of using a forms package: the inability to manipulate the data once it's been entered. For example, TrueForm can "screen" 4D data so that it prints into the correct blanks of a form. And some people are willing to endure working with scanned forms in order to reap the benefits—the ability to fill them in electronically and print them out looking identical to the original.

## THE FORMATIVE STAGES

The existing trio of forms packages, then, solves only certain aspects of the forms


  
**be government-  
 tal agencies have their  
 own particular forms,  
 with their particular  
 stamps and number codes.  
 We scan the forms in and  
 print them directly, so  
 that it looks like the origi-  
 nal forms. If you've ever  
 tried to put a form in a  
 typewriter and type on  
 it—it's a nightmare.**

*Frank McCallister, MIS  
 director, Compliance  
 Specialists, Santa Rosa,  
 California*

processing problem. Fast Forms is useful for quick, limited forms design. The elegant SmartForm lets you design and complete new forms electronically, but it doesn't have the flexibility for professional forms design, and it can only export data, not import it. And TrueForm excels at transforming existing graphics into intelligent forms, but makes revision a chore (and revision, as any forms designer will tell you, is one of the main reasons for computerizing the process).

Furthermore, none of these programs have more than a hint of the page-layout capabilities—leading, kerning, tab stops, and so on—that are so essential to text-based forms like contracts. None provide professional-level printing features like

crop marks or spot-color capabilities. Worse, none possess more than rudimentary data processing skills. As long as your data resides in SmartForm or TrueForm, it can't be interrelated to other data, sorted, or analyzed. As a result, the benefits of computerizing your forms processing operation are sharply curtailed.

## FORMS FUTURES

Clearly, a forms processing package that meets some of these basic requirements would be an immense success in the software market, and a number of companies know it. A new generation of programs is being readied; each promises to be a more complete forms package than anything available now. Keep in mind, however, that none of the following programs have been released at this writing. And by the time they are available, the current forms programs may well have been substantially improved.

### BECOMING INFORMED

One of the most promising programs is called Informed. It's being developed by Shana, the original creator of Fast Forms, and its ambitious aim is to become a complete forms solution.

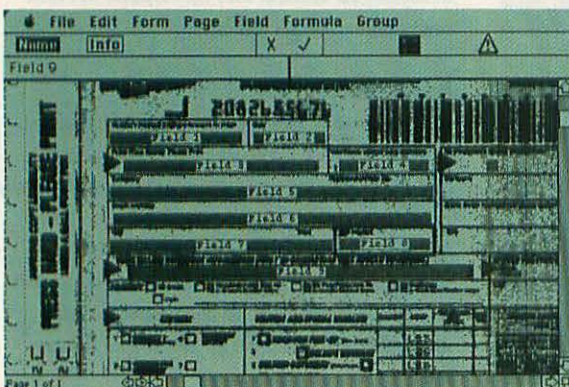
Informed includes two programs that will be sold separately: the designer program and the manager program. The designer program, which Shana promises will be available by the time you read this, is akin to the SmartForm Designer. In other words, it's an object-oriented, MacDraw-type graphics package with a field tool, a table tool, and so on.

I tested a prerelease copy of the Informed designer program, and sure enough, it eliminates many of the restrictions imposed by SmartForm's click-and-go forms tools. You can, for example, change the line thickness of individual lines in a table or of the individual walls of a field. Informed also offers adjustable comb heights, a feature dear to the hearts of many forms designers.

And with a forms length of up to 99 pages, Informed designer shatters SmartForm's 10-page-form limit. Forms can also

### Truth but Not Beauty

*You may not recognize this standard Federal Express shipping form. That's because it's been scanned into TrueForm at 300 dpi and is being displayed at 72 dpi (the Mac's resolution). When it prints, the form will look exactly like the original high-quality scanned form. But while the fields are being created (automatically) and while you're entering data, you'll have to bear with this coarse display.*





include spot color and crop and registration marks. Like SmartForm, the Informed designer includes extensive math functions, help messages, and error messages for the use of the person filling out the finished form.

But if this "SmartForm-plus" approach were all that distinguished Informed from the rest, the program wouldn't be very remarkable. Luckily, Informed has an ace up its sleeve: a companion program called the Informed Manager (which won't be released for many months).

You'll use Manager to fill in forms created with the designer. But the program's claim to fame is that it will come much closer to being an actual database than the existing fill-in programs: it will offer searches, sorts, a view-by-list feature, and a multiple-selection feature for collecting different sets of forms—the fruits of different searches—into one printable batch. In other words, the Informed system will be the first attempt to tackle the entire electronic forms processing problem, from design to data entry to data processing.

## RAGTIME

RagTime 3, which should be released by the time you read this, takes a radically different approach to forms design. Instead of being based on a draw program approach, RagTime began life as a page-layout program with built-in spreadsheet capabilities. That combination makes it an odd bird in the general software marketplace but unusually well suited for forms generation.

Because it's primarily a page-layout program, RagTime 3 puts the text-manipulation skills of the dedicated forms programs to shame. Character-by-character kerning, leading, and text flow are available. So are spelling checking, search-and-replace, and automatic hyphenation—all features that would be unheard of in dedicated forms packages.

Yet RagTime is no slouch when it comes to forms-specific features. For example, RagTime's spreadsheet capabilities makes the table tools in the forms packages seem inflexible by comparison. Cells automatically expand vertically as you fill them with text, and other cells in

the same row remain aligned. You can specify the line thickness for every wall of every cell. Indeed, you can even set the tab stops, line spacing, and indents of every cell independently—features that would seem superfluous in a spreadsheet, but are essential in a professional forms-design package.

RagTime imports every conceivable graphics and file format: EPS, TIFF, PICT, FOTO, SYLK, TEXT, and more. With certain scanners you can scan an existing form directly into the program, just as you can with TrueForm. Most dramatic of all, RagTime 3 can have live links to 4th Dimension databases—not simple lookups, but two-way, automatically updating links. And you can



STEVEN MECKLER

*"Can you even imagine handwriting these things anymore?" asks Vickie Lamparis, a TrueForm user from Cactus Computer Service in Phoenix. "It's just unheard of now—we just don't do that anymore."*

merge the data from 4D with the form template

you've designed in RagTime 3 en route to the printer, just as you can with TrueForm.

There are some limitations, of course. While RagTime has many ingenious provisions for forms design, its data entry system is not nearly as capable as those in dedicated forms programs. You can't create instant check boxes or radio buttons. You can't create pop-up error or help mes-

THE CZAR  
666 ANY STREET  
TROUBLE TOWN, USA

## PAPER KEYBOARD

**M**ost forms-software designers are concerned with the design, printing, and management of forms. Designers assume that the easiest way to enter data is for somebody to type it in.

For people in some businesses, however, typing isn't ideal. Imagine the census taker who must go door to door. How can the Census Bureau translate that data into electronic form? Datapac would answer: Paper Keyboard.

This unusual program features handwriting-recognition technology that translates scanned, handwritten letters and numbers into data that can be exported to a database. You can't just scribble your name and address: you must write letters and numbers into one square at a time, in a special all-capital form that Paper Keyboard can recognize (as shown above).

And how well does it work? The answer depends on how carefully you match the special character set. Paper Keyboard sometimes mixes up letters A and H, and numbers 4 and 9. Otherwise, it does fairly well. Fortunately, it's smart enough to ask you to confirm its guesses when it's unsure. This program isn't for casual use, however. At \$945 (not including the scanner), it's quite an investment, so make sure you see a demonstration before buying. And you have to learn a C-type programming language before you can create any Paper Keyboard-recognizable forms. If these prerequisites don't scare you, and if you can train either your personnel or your customers to take the necessary extra care in filling out your forms (which they will do if they're applying for something), Paper Keyboard shows high-tech promise.



## FORMS FEATURES

## Currently Available

## Not Yet Released

## Database

## Fast Forms

## SmartForm

## TrueForm

## Panorama

## Informed

## RagTime 3

Company	Preferred Publishers	PowerUp Software	Claris Corporation	Adobe Systems	ProVue Development	Shana Corporation	Migrant Software
Price	\$129.95	\$149.95	\$399*	\$395†	\$395	\$295†	\$595
<b>Forms Design</b>							
Check boxes	yes	yes	yes	no	no	yes	no
Combs	no	no	yes	no	no	yes	no
Tables	no	no	yes	no	yes	yes	yes
Scan directly into program	no	no	no	yes	no	no	yes
Import scanned images	yes	yes‡	yes	yes	yes	yes	yes
Radio buttons	no	no	no	yes	no	yes	no
Rotated text	no	no	yes	no	no	yes	yes
User-defined tab order	yes	yes	yes	yes	no	yes	yes
Import TIFF, PICT,	no/yes‡	yes‡/no	no/yes	yes/yes	no/no	yes/yes	yes/yes
Import EPS, FOTO	no/no	no/no	yes/no	yes/no	no/no	yes/no	no/no
Grays	no	100	8	no	8	100	unlimited
Line thicknesses	no	7	34	no	7	unlimited	unlimited
Adjustable field margins	no	no	no	no	no	no	yes
Tab stops in text block	no	no	no	no	no	no	yes
Vary line thickness in tables	no	no	no	no	no	yes	yes
Leading control	no	no	no	no	no	yes	yes
Kerning control	no	no	no	no	no	no	yes
Variable comb heights	no	no	no	no	no	yes	no
<b>Basic Functions</b>							
Undo	yes	yes	yes	no	yes	yes	yes
Zoom in and out	no	yes	yes	no	yes	yes	yes
Text entry while designing	no	yes	partly <sup>11</sup>	no	yes	yes	yes
Export data to text file	yes	yes	yes	yes	yes	yes‡	yes
Maximum form length (in pages)	1	1	10	unlimited	1	99	unlimited
Fill in with disk accessory	yes	yes	no	no	no	no	no
<b>Calculations</b>							
Data entry constraints	no	numeric only	yes	yes	no	yes	no
Math functions	4	4	70	45	37	149	150
Multiple choice	yes	no	yes	yes	yes	yes	no
Pop-up help/error messages	no/no	no/no	yes/yes	yes/yes	yes/no	yes/yes	no/no
<b>Database Functions</b>							
Search/sort	yes/yes	no	yes/no	yes/no	yes/yes	yes/yes‡	no
Print selected	yes	no	yes	yes	yes	yes‡	no
View by list	yes	no	no	no	yes	yes‡	no
Active links to database	2-way	no	no	1-way (4D)	2-way	no	2-way (4D)
<b>Printing</b>							
Print data only	yes	yes	yes	yes	yes	yes	yes
Crop marks	no	no	no	no	no	yes	yes
Spot color	no	no	no	no	no	yes	yes
Merge with database text file	yes	yes	yes	yes	yes	no	no

\*\$49 for each extra copy of Assistant program; \$750 for 50-user site license. †\$295 for four additional copies of fill-in program. ‡\$195 for Manager program.

§Via the Clipboard. <sup>11</sup>Displays its own sample data. <sup>12</sup>With not-yet-released Informed Manager program (\$195).



sages. And, perhaps most troubling of all, there's no separate (inexpensive) program used for completing the forms. If you have ten employees filling in electronic forms, you're supposed to buy ten copies of the \$595 program, which makes your forms processing setup expensive indeed. Nonetheless, RagTime 3's page-layout, text processing, and data processing skills are prodigious, making it an ingeniously different kind of forms program.

## THE DRAWING BOARD

Finally, on the distant horizon, there's another possible forms-creation contender. This as yet untitled program is being developed by SoftView (the makers of MacinTax) and is still many months from completion.

The new program completely abandons the object-oriented approach in favor of a unique rows-and-columns concept that works something like the table-making feature in Microsoft Word 4: as you type text into a cell, the cell increases in depth, if necessary, and all other parts of

**r**ight now we  
have a firm contract with  
a legal publishing house  
to do 450 forms on the  
Mac. But we don't have a  
program. That's the whole  
story in a nutshell—we  
don't have a program that  
will work. So we're  
waiting.

*Roger Williams, forms  
designer, San Rafael,  
California*

the form that are horizontally aligned with the cell grow taller too. The goal is easy revision: make one slice of a form taller or wider, and the rest of the form grows or shrinks simultaneously, eliminating the need to adjust every field and table. The new program has no data entry capability, no calculating fields, and no user alert messages. It is purely for forms design.

## FORMING OPINIONS

If you're looking at forms software—and, perhaps, shaking your head with doubt—there's something else to consider. It may be that the best possible forms program for you isn't a forms program at all.

Instead of choosing a forms program with crude database functions, for example, consider an actual database. Panorama, for example, is a powerful flat-file database program with lookup skills. It also has graphics-generation tools that surpass those in most of the forms

programs that are currently available.

Even the tried-and-true FileMaker II is worth mentioning. While its graphics capabilities are crude in comparison to Panorama's, they certainly hold their own against a program like Fast Forms. And FileMaker is a splendid database in its own right.

Any database of this type offers big advantages over the existing crop of forms programs. For example, you can create several forms that access the same set of data. You might enter the vital statistics of your clients into the database, and thereafter create 20 or 30 forms that consult the database, extracting and printing the appropriate information as necessary.

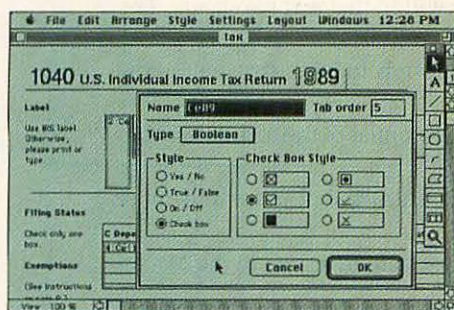
## FORM THIS MOMENT ON

At the moment, no single forms program comes close to constituting a complete forms processing solution. Page-layout programs are better for forms design, and databases are better at data management. When the new forms programs reach the market, they'll undoubtedly solve more of the forms processing equation in a unified, flexible way. Perhaps we'll someday see one with the simplicity of Fast Forms, the elegance of SmartForm, and the instant-field-creation feature of TrueForm. Such a program may even have the professional-level specs of Informed and the page-layout skills of RagTime 3, and with any luck, the database capabilities of Panorama or FileMaker.

That will be a great day for the forms designers who still do their painstaking work in PageMaker, for the small companies who want to computerize their piles of handwritten forms, and for the bigger companies that now throw out thousands of dollars' worth of obsolete paper forms each year. In the meantime, the forms processing equation remains incomplete; you might say that there are still a few blanks left to fill in. ■

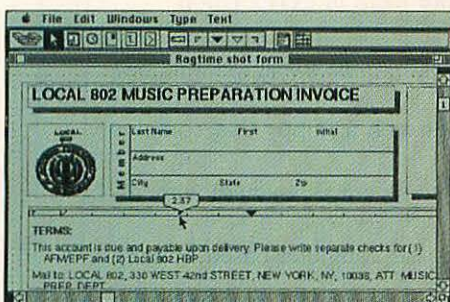
See *Where to Buy* for contact information.

.....  
**David Pogue**, a Macworld contributing editor, is also a magician, composer, and Broadway conductor. He lives in New York City.



### Check It Out

The not-yet-released Informed designer offers dozens of formatting options. For example, you can create a check box with any of the formats shown in this dialog box.



### Rag Content

RagTime's page-layout heritage is evident in the power of its text-block formatting features; you can set the tabs and indents for every paragraph independently (as shown here). This form uses some of RagTime's other features, too: the logo was scanned directly into the program, the Member text was rotated, a spreadsheet was used to create the address fields, and so on.



**H**ave you ever slipped the shrink wrap off a new software program, popped the floppy into your Mac's drive, and suddenly found yourself lost in a no-man's-land full of unfamiliar menu items and inscrutable tools? As applications become more and more complex (read "difficult to learn"), we begin wishing personal tutors came bundled in every box.

Few of us can afford to spend our time fumbling through a new program. We may resort to the manual that accompanies the application, but it is often too sketchy to be of much assistance. The more comprehensive ones generally make better reference volumes or doorstops than introductory texts. The online tutorials bundled with some programs whet the appetite, but few offer more than a cursory glance at an application's features. Consequently, a great number of users never fully explore or utilize their Mac

# MASTERING THE MAC

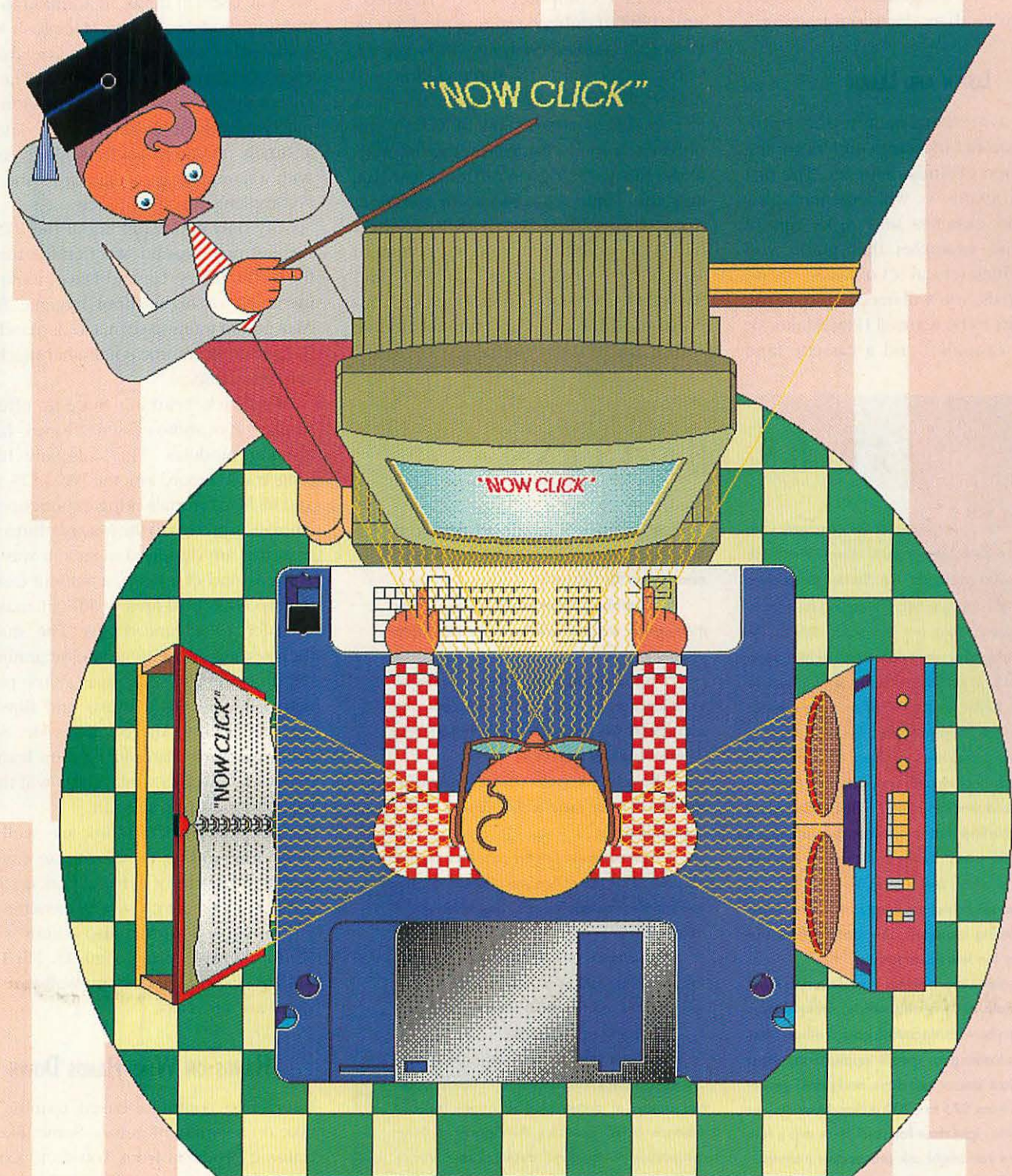
*by Suzanne Stefana*

applications. According to Dataquest, a San Jose-based market research firm, the number of personal computers will double within the next two years. The need for clear and thorough training that will allow users to realize the full potential of the technology becomes imperative. Recognizing that more and more individuals and businesses are investing in the Macin-

tosh, an ever-growing number of third-party companies are developing training materials for Mac-based applications. You can now choose from among instructor-led classes (see "Head of the Class"), books, videos, and interactive tutorials. There is no longer any excuse for staring at a new menu bar and scratching your head in exasperation.

Within the context of this article, I will look at interactive tutorials that enable you to learn while working with the Macintosh. Each comes with a floppy that contains reference materials, examples, and progressive lessons; some are augmented with audio tapes and/or written materials. The advantage of these computer-based training (CBT) programs is that students can pace themselves; it is easy to skip early lessons.





"NOW CLICK"

"NOW CLICK"

"NOW CLICK"



or repeat difficult ones; training materials can be reused by other students; and computer-based programs are generally less expensive than classroom training.

## LISTEN AND LEARN

Educators agree that a multisensory learning environment increases understanding and retention of study materials. The first training programs we will look at employ both audio cassettes and disks full of lessons and examples that guide you through a hierarchical set of tasks. To use these tutorials, you will need copies of the applications to be learned (PageMaker or Word, for example) and a cassette tape

player, preferably one with a counter.

In an earlier overview of training products ("Computer-Based Training," June 1988), I dubbed training products by Personal Training Systems (PTS) my favorite set of tutorials. Apple, Aldus, and Adobe all seem to agree. Apple now uses PTS modules to train many of its new employees, and it distributes the tutorials under the Apple logo in Australia, Canada, and the United Kingdom. In addition, Apple has worked with PTS to conduct hands-on training at the Government Technology Conferences, DEXPO, and Seybold. Aldus and Adobe include coupons good for one PTS training module with many of their products.

Comprehensive, multitiered, and explicit, the PTS series is designed with real-life Mac users in mind. In addition to four training modules for the Macintosh itself, a graduated set of modules is available for each of eight applications (see "A Training Directory"). The well-planned lessons are nicely paced and modules are updated in a timely manner. Each module comes with a summary card that offers the user a complete lesson overview.

My only complaint about the PTS series last time around was that the tone of the two trainers, Liz and Dave, reminded me a bit of high-school hygiene films. Alas, audio training seems to demand that the speakers assume somewhat mechanical personalities.

FlipTrack Learning Systems offers a similar set of audio cassette/floppy-based training modules. The company has a long track record on the MS-DOS side, and its Mac tutorials bring experience and a novel approach to the Mac platform. The cassettes are designed in such a way that at the sound of a beep, a student can flip the tape over and review difficult material or listen to advanced tips. The student then rewinds the tape to the beginning of the tip or review sequence (a tape player with a counter is a must) and flips the cassette back to the original side. Some users will love customizing their learning experience in this way; others will throw their mouse up in despair.

The FlipTrack lessons are well designed, providing users with an easy-to-assimilate body of information on each topic. Packaged with several cassettes and a floppy, each tutorial also comes with a comprehensive printed guide. FlipTrack updates its tutorials as new software versions are released.

## HANDS-ON WINS HANDS DOWN

Interactive computer-based training can take on a variety of guises. Some, like the training products from Tutorland Corporation, are similar to PTS and FlipTrack in that they lead the student through the intricacies of an application in a hands-on, step-by-step manner. While there is no audio component to the Tutorland modules, they do come with manuals that are

# HEAD OF THE CLASS

**S**ome of us remember the classroom with more fondness than others. For those who prefer to familiarize themselves with a Mac application by attending an instructor-led class, there are numerous options. To find a listing of commercial classes in your area, check with your favorite dealer, user group, or local computer magazine. Also, many companies are beginning to offer in-house training seminars, and classes are often offered in conjunction with computer symposia.

Potential advantages in a classroom setting include the fact that lessons can be customized for specific users' needs and students can ask questions when they are in trouble. Possible problems might include inept instructors, mediocre training materials, too many fellow students, or too few Macintoshes.

Like the interactive Mac-based tutorials listed in the main body of this article, some classes acquaint you with Macintosh basics; others offer in-depth training for specific applications. Most classes last one or two days, and prices generally run from \$75 to \$200 a day. How do you choose the right class for you? Here are a few questions you might ask prospective trainers.

■ What is the trainer's previous area of expertise? How long has she or he been teaching similar classes?

■ Are the classes conducted at dedicated

training centers with a sufficient number of Macs and access to printers? For larger businesses, can the classes be conducted on-site?

■ What about personalized training? How many other students will be in the class with you?

■ Will students with different levels of experience on the Macintosh be included in the same class? Are classes available that address different levels of expertise?

■ Do program-specific classes include instruction for the most recent version of the application?

■ How extensive are the reference materials used in the class? Are you allowed to keep any training materials upon completion of the training?

■ Developers such as Apple, Aldus, Microsoft, and MacroMind authorize classes that meet specific criteria. Is this class one of these?

■ Is there any follow-up?

A great number of companies offer Mac-oriented classes, and some have Apple's official stamp of approval. The Apple Training Alliance (ATA) provides third-party training companies, authorized dealers, and value-added resellers with materials for instructing users in a variety of applications. Pricing for the classes is up to the individual ATA members. For referrals, call 800/732-3131, ext. 300.



both hefty and inviting—a real plus for those who might want to look features up after completing the course.

Tutorland began in France, and the company's products are used in both Apple- and Microsoft-authorized training centers in that country. In addition to the modules already available, others for QuarkXPress, Microsoft Works, Advanced Excel, and Advanced 4th Dimension are being translated from the French. For those who prefer to forgo audio-based training, Tutorland offers a professional array of training packages that are comprehensive and easy to follow.

Heizer Software offers another set of training solutions. More a clearinghouse than a dedicated developer, Heizer offers a catalog that brings together a spectrum of individually created tutorials for Excel, Works, and HyperCard. Prices range from \$6 for the Format Number Tutorial (for Excel) to \$69 for Templates of Doom. Actually, Templates of Doom is also available from its developers (Solar System Software), and its game format makes learning Excel as close to fun as it's ever going to get.

## CLASS FLOPPIES

Help Software offers a two-pronged approach to computer-based training. Desktop Help for Excel 2.2, a desk accessory with a carefully indexed body of 700 entries, was written with Desktop Help. For those who would like to create their own online help for applications other than Excel (Help Software should have a module for Word 4.0 out by the time you read this) or who would like to provide online help for office procedures or vertical applications, the Desktop Help Engine 3.0 promises to be a viable solution. It comes with two desk accessories—one for creating online help and one for reading the help files. Also included is a copy of Help Editor and a license that allows you to make 50 more copies of your new Help DA.

The Excel electronic manual arrives as a read-only file, but it can be edited using Desktop Help; GetHelp for Excel 2.2, a Help Software external, can be used to make custom documentation context-

## Interactive Audio/ Disk-Based Training

### FLIPTRACK LEARNING SYSTEMS

999 Main, #200, Glen Ellyn, IL 60137;  
312/790-1117, 800/222-3547

How to Operate the Macintosh	\$89
3 cassettes, disk, and guide	
How to Operate the Macintosh II	\$109
4 cassettes, disk, and guide	
How to Use Excel 1.5	\$119
4 cassettes, disk, and guide	
How to Use Excel 2.2	\$119
4 cassettes, disk, and guide	
How to Use PageMaker—Macintosh Version	\$195
5 cassettes, disk, and guide	



How to Use Word 3.0	\$99
4 cassettes, disk, and guide	
How to Use Word 4.0	\$99
4 cassettes, disk, and guide	
Introduction to Design for Desktop Publishing	\$295
8 cassettes, study guide, and design tools	
<i>Requirements: same as the application.</i>	

### PERSONAL TRAINING SYSTEMS

P.O. Box 54240, San Jose, CA 95154;  
408/286-0176, 408/559-8635



Excelerate	
Beginning Spreadsheets	\$49.95
Intermediate Spreadsheets	\$49.95
Advanced Spreadsheets	\$49.95
Excelerate Macro Modules	
Beginning Macros	\$49.95
Advanced Macros	\$49.95
Excelerate—Other Courses	
Creating Business Graphs	\$49.95
Building Databases	\$49.95
Linking Spreadsheets	\$49.95
What's New for 2.2	\$49.95
HyperEasy	
Using HyperCard	\$49.95
Creating Cards and Stacks	\$49.95
Basic Scripting	\$49.95
Advanced Scripting	\$49.95
Learn 88	
Beginning Illustrator 88	\$49.95

Intermediate Illustrator 88	\$49.95
Creating Special Effects	\$49.95
Precision Drawing Techniques	\$49.95

Learn FileMaker	
Beginning FileMaker	\$49.95
Intermediate FileMaker	\$49.95
Advanced FileMaker	\$49.95
Tips & Techniques	\$49.95

Learn Persuasion	
Beginning Persuasion	\$49.95
Intermediate Persuasion	\$49.95
Creating AutoTemplates	\$49.95
Creating Artwork	\$49.95



Learn Word	
Beginning Level	\$49.95
Intermediate Level	\$49.95
Advanced Level	\$49.95
Additional Features	\$49.95
LearnWord 4	\$49.95

MacTeach	
The Basics (for two floppy drives)	\$49.95
The Basics (for Mac Plus or SE with hard disk)	\$49.95
The Basics (for Mac II with hard disk)	\$49.95
Beyond the Basics	\$49.95

MasterWorks	
Database & Form Letters	\$49.95
Advanced Database	\$49.95
Spreadsheets	\$49.95
Word Processing	\$49.95

Page Tutor	
Beginning PageMaker	\$49.95
Intermediate PageMaker	\$49.95
Tips & Techniques	\$49.95
Advanced Features	\$49.95
<i>Requirements: same as the application.</i>	

## Interactive Disk-Based Training

### HEIZER TUTORIALS

Heizer Software, 1941 Oak Park Blvd., #30,  
Pleasant Hill, CA 94523;  
415/943-7667, 800/225-6755

Excel Tutorials	
Advanced Chart Tutorial Set	\$36
Advanced Chart Tutorial I	\$15
Advanced Chart Tutorial II	\$15
Advanced Chart Tutorial III	\$15
Array Tutorial	\$15
Carpet Chart Tutorial	\$18
Chart Tutorial	\$15
Clock Chart Tutorial	\$15
Command Macro Tutorial	\$25



Custom Menu Tutorial	\$15
Database Tutorial	\$15
Date/Time/Calendar Function Tutorial	\$8
Dialog Box Tutorial	\$15
Excellence (Microsoft Excel user journal)	\$49
Financial Function Tutorial	\$8
Format Number Tutorial	\$6
Function Macro Tutorial	\$15
Guided Tour of Excel	\$15
Linking Tutorial	\$10
Lookup Table Tutorial	\$9
Macro Recorder Tutorial	\$9
Protection Tutorial	\$10
Sorting Tips and Tricks	\$15
Special-Purpose Function Tutorial	\$15
Statistical Function Tutorial	\$8
Surface Chart	\$25
Table Tutorial	\$10
Templates of Doom	\$69.95
Text String Tutorial	\$7
Textural Bar Graph Tutorial	\$15
Tip Sheet	\$9
Top 10 Excel Questions	\$8
Worksheet Function Tutorial	\$15
<b>HyperCard Tutorials</b>	
Advanced Animation Tutorial	\$15
Advanced Sorting Tutorial	\$15
Animation Tutorial	\$8
Array Tutorial	\$10
Beyond Help	\$6
Building Directory Tutorial	\$12
Calculated Fields Tutorial	\$8
Dialog Box Tutorial	\$12
Guided Tour of HyperCard	\$15
HyperTalk Tricks	\$10
Special Effects Printing Tutorial	\$15
Sticky Button Tutorial	\$8
Top Ten HyperCard Questions	\$8
Tricks of the HyperTalk Masters (4-disk set)	\$50
Complete HyperTalk Reference	\$15
Developer's Tools	\$15
Main Tricks	\$15
Sound and Front Ends	\$15
<b>Works Tutorials</b>	
Chart Tutorial	\$9
Database Tutorial	\$12
Financial Function Tutorial	\$8
Guided Tour of Works	\$15
Integrating Works	\$10
Sorting Tips and Tricks	\$15
Sorting Tutorial	\$6
Spreadsheet Design	\$10
Spreadsheet Formulas	\$15
Spreadsheet Guided Tour	\$9
Statistical Function Tutorial	\$8
Word Processing Tour	\$6

Requirements: same as the application.

## HELP SOFTWARE, INC.

10659-A Maplewood Rd., Cupertino, CA 95014;  
415/524-1356

Desktop Help for Excel (on-line manual, for 1.5 and 2.2)	\$79.95
Desktop Help (The Help Engine) 3.0	\$395
4th Help (context-sensitive help for 4th Dimension)	\$30
GetHelp for Excel 2.2 (context-sensitive help)	\$30
OpenDA (context-sensitive help for Omnis)	\$30
Requirements: Mac Plus.	

## INDIVIDUAL SOFTWARE, INC.

125 Shoreway Rd., #3000, San Carlos, CA 94070;  
800/535-0900

Individual Training for PageMaker	\$69.95
Individual Training for Word (4.0)	\$69.95
Requirements: Mac Plus.	

## LAYERED, INC.

529 Main St., Boston, MA 02129; 617/242-7700

Notes . . . for Excel 1.5	\$79
Notes . . . for PageMaker 3.0	\$79
Notes . . . for Ready, Set, Go	\$79
Notes . . . for Word 3.02	\$79
Notes . . . for Works	\$79
\$395 for a five-pack	
Requirements: Mac Plus.	

## SOLAR SYSTEM SOFTWARE

8105 Shelter Creek, San Bruno, CA 94066;  
415/952-2375

Templates of Doom	\$69.95
Requirements: Mac 512K.	

## TECHWARE, INC.

P.O. Box 1085, Altamonte Springs, FL 32715;  
407/695-9000

Understanding PageMaker	\$95
2 Novice disks, 1 Advanced disk, and 1 Reference disk	
Requirements: Mac Plus.	

## TUTORLAND CORPORATION

10050 N. Wolfe Rd., SW2-136, P.O. Box 160429, Cupertino, CA 94016;  
408/973-0472, 800/888-8689

Teach Yourself Excel 1.5	
2 modules, \$49.95 ea. (\$79.95 both)	
Teach Yourself Excel 2.2	
2 modules, \$49.95 ea. (\$79.95 both)	
Teach Yourself 4th Dimension 2.2	
2 modules, \$49.95 ea. (\$79.95 both)	
Teach Yourself HyperCard	
2 modules, (not available separately) \$79.95	
Teach Yourself PageMaker 3.0	

2 modules, \$49.95 ea. (\$79.95 both)	
Teach Yourself Word 3.0	
2 modules, \$49.95 ea. (\$79.95 both)	
Teach Yourself Word 4.0	
2 modules, \$49.95 ea. (\$79.95 both)	
Requirements: same as the application.	

## Typing Tutorials

### BRØDERBUND SOFTWARE, INC.

17 Paul Dr., San Rafael, CA 94903; 415/492-3200



Type \$29.95  
Requirements: Mac Plus.

### INDIVIDUAL SOFTWARE, INC.

125 Shoreway Rd., #3000, San Carlos, CA 94070;  
415/595-8855, 800/331-3313

Typing Instructor Encore	\$29.95
Requirements: Mac 128K.	

### MINDSCAPE, INC.

P.O. Box 1167, Northbrook, IL 60065;  
312/480-7667, 800/221-9884

MasterType	\$49.95
Requirements: Mac 128K.	

### PALANTIR SOFTWARE

12777 Jones Rd., Houston TX 77070;  
713/955-8880, 800/368-3797

MacType	\$59.95
Requirements: Mac 128K.	

### QED INFORMATION SCIENCES, INC.

P.O. Box 181, Wellesley, MA 02181;  
617/237-5656, 800/343-4848

Typing Made Easy	\$49.95
Requirements: Mac Plus.	

### SIMON & SCHUSTER COMPUTER SOFTWARE

1 Gulf and Western Plaza, New York, NY 10023;  
212/373-8882, 800/624-0023  
800/624-0024 in New Jersey

Typing Tutor IV	\$39.95
Requirements: Mac 512K.	

### SPINNAKER SOFTWARE CORPORATION

1 Kendall Sq., Cambridge, MA 02139;  
617/494-1200, 800/826-0706

BetterWorking Typing Made Easy	\$49.95
Requirements: Mac 128K.	



sensitive (point to a menu item on an Excel spreadsheet, for instance, and the appropriate help window appears). Externals are also available for 4th Dimension and Omnis documents. Two nice features of files created with Desktop Help are the fact that the online help files don't need to be closed to work with the already open application, and that Help files don't count as one of the 15 allowed Apple DAs (Help doesn't appear in the DA menu until the appropriate application is open). Because Help Software is committed to working with Apple when System 8.0 phases out DAs, we may be hearing from these folks for a long time.

## STUDYING PAGE LAYOUT

Techware's Understanding PageMaker is a beautifully designed HyperCard stack. Installed as a desk accessory, the program accesses information that arrives on four floppies: the two Novice disks guide you through the creation of a PageMaker document; the Advanced disk demonstrates specific features; and the Reference disk provides tips arranged according to feature and subject, as well as point-and-click explanations for menu items, icons, and layout parts. The DA's interface is a pleasure to work with, and the content is designed to solve common desktop publishing problems.

Individual Training for PageMaker, from Individual Software, includes exercises and quizzes on topics from Mac basics to advanced formatting. The interactive on-screen tutorials appear in their own window on top of PageMaker. The advanced section contains some nice tips.

Another set of desk accessories that offers online help and expert advice is available from Layered. The Notes packages provide brief tutorials and fairly comprehensive reference files for commands and functions. One drawback is that neither the Microsoft Word nor the Excel modules have been updated recently.

## TOUCH TYPING

Even power users who know secret, unpublished key sequences for obscure features find themselves at a distinct dis-

advantage if their typing skills are not up to par. It is possible that Macs may one day be voice activated, but until that time, many of us might want to avail ourselves of one of the typing tutor programs now on the market.

My favorite is Type from Brøderbund. Abandoning the random letter sequences traditionally found in typing lessons (*kkll ddff*), Type drills contain actual sentences emphasizing certain patterns and skills. Not only do you get to choose which drills to practice, you set goals for yourself. Upon completion of the drill, you see your speed and accuracy scores, misspelled words, weak keys, and how you fared against your goal. (The Type-Athlon arcadelike game included in the program pits your actual speed against your goal.)

Easy-to-read bar graphs let you analyze your speed and accuracy by individual finger, by hand, or by keyboard letter. Based on these diagnostics, Type suggests drills to improve your weak points.

Children can choose the Elementary School Text for their lessons, and advanced typists can practice advanced techniques. Overall, Type combines an excellent use of the Mac interface with good teaching techniques.

Individual Software's Typing Instructor Encore also offers drills made up of real paragraphs. To begin, you can run a demo and then dive into the drills listed under the Learning and Skills menus. Once you've achieved some proficiency, you can practice using the Lobster Sea Adventure game, and you will monitor your progress using eight standard tests. To actually view your progress, you can see your speed and accuracy scores for your last ten tests in bar graphs.

QED Information Sciences' Typing Made Easy and Simon & Schuster's Typing Tutor IV are major players in both the Mac and the MS-DOS realms. Palantir's Mac-Type lets an instructor keep records on up to 100 students at a time, and there is a Dvorak option for those who prefer that keyboard configuration to QWERTY.

## TESTING, TESTING

The real test for any training program is whether or not you are able to realize the

# TOP TUTORS

Here are *Macworld's* picks for best tutorials in three categories:

## INTERACTIVE AUDIO/DISK-BASED TRAINING

### Personal Training Systems

Whether you are a new or an experienced user, Personal Training Systems designs a wide variety of training modules that will enhance your ability to make the most of the Mac and its applications.

## INTERACTIVE DISK-BASED TRAINING

### Tutorland Corporation

With an expanding catalog, Tutorland offers elegant, easy-to-follow training. The notebooks that augment the disk-based tutorials serve as handy reference texts for students who graduate from the course.

## TYPING TRAINING

### Type

Type from Brøderbund takes the sting out of learning to master your keyboard. Even longtime typists can use the program to diagnose and strengthen their weak points. Type's a pleasure to use.

full potential of an application after completing the course. This obviously depends as much on the commitment of the student as it does on the quality of the tutorial itself. Choosing the right training method for your needs can guarantee that you maximize your investment and that your time spent with the Macintosh will be productive and enjoyable.

Computer-based training has a lot to recommend it: it provides hands-on experience; students can pace themselves; training modules can be reused by each new employee; and it is relatively inexpensive. As the Mac continues to invade the workplace and as applications become more complex, CBT programs will assume more and more importance in the overall planning of any Mac user. ■

See *Where to Buy* for contact information.



# HOT WAX COLD INK

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Many people when faced with a big decision use the list method. That is, they take a sheet of paper and on the left side they write down the pros and on the right side the cons. Unfortunately, the list method doesn't always work.

Take the subject at hand, color printers. A list of pros and cons doesn't take into account one weighty question—what is the printer's purpose? For the person who needs to print everyday output such as memos or reports and who thinks that it surely would be nice to have color capabilities to create an occasional impressive presentation, the pros would have to outweigh the cons in order to justify the purchase of a color printer. But for people who need to create a lot of color overhead transparencies for presentations, to view color comps, or to storyboard a multimedia video, only a color printer will do; necessity outweighs the seriousness of any cons.

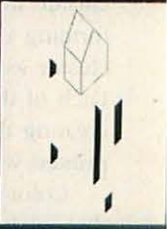
*Macworld*

*reviews 19 color*

*printers, complete*

*with lab tests*







How do color printers stack up in the pros-and-cons list? The pros side of the page contains these notations: hardware technology is improving (some output is almost photographic in quality), and printer prices are coming down. But the cons side of the page has many more entries: the printers require special (and costly) paper; they're slow; the software that runs them is often problem-plagued; and except for the printers with hardware PostScript interpreters, their text is not as high-quality as that from PostScript laser printers. In fact, you can't even get Adobe PostScript output from a color printer that costs under \$10,000—a sum twice the price of an average laser printer.

*Macworld* tested 19 color printers ranging in price from \$1520 (the Hewlett-Packard PaintJet) to \$17,950 (the Océ G5232 Color PostScript Printer). All use some variation of ink-jet or thermal-transfer printing technology. Most work the way laser printers do, depending on application compatibility to produce a print. Some ink-jet and thermal-transfer printers offer PostScript compatibility, although only thermal-transfer printers from QMS, Tektronix, and Océ implement a PostScript interpreter in hardware. Some thermal-transfer printers only make prints of an image displayed on a Mac's monitor. (see "Video Printers").

## TECHNOLOGY

In traditional offset printing, continuous-color images such as photographs are reproduced by processing the cyan, magenta, yellow, and black components of the original image separately through halftone screens. These screens are laid at different angles for each color so that when printed the resulting halftone dots cluster in groups of four, each group forming a blob of color. The eye sees the cluster as one dot of a particular color. Each of the dots can be a different size, creating the illusion that the image was printed with inks of varying density.

Color printers can't process colors through halftone screens. PostScript printers, however, simulate halftones. In true halftoning, dots can be printed at varying sizes and angles. Although PostScript

printers for the Macintosh can print dots at varying angles, they can't vary the size of the dots. So these printers produce a halftone effect, not true halftoning.

All of the QuickDraw printers use a halftone-related process called dithering. In dithering, dots are still printed in groups (each group of dots representing a pixel). But unlike the dots in halftones, dots in dithered images are fixed in size and angle and are printed in evenly spaced rows across the page. The human eye still mixes these dots to perceive various colors, but the effect isn't nearly as smooth as it is in halftone printing.

Printers use anything from a 2-by-2 to a 16-by-16 matrix of dots to create a color pixel. The number of dots of each color determines the pixel's overall hue, saturation, and brightness. For instance, if a printer used a 4-by-4 matrix, then printing 100 percent yellow would mean that a pixel would contain 16 yellow dots. Fewer yellow dots would be printed in each pixel in order to make the yellow lighter. The smaller the matrix, the better the perceived resolution—at least in most cases (see "Dither Patterns Explained").

## THE EXCEPTIONS

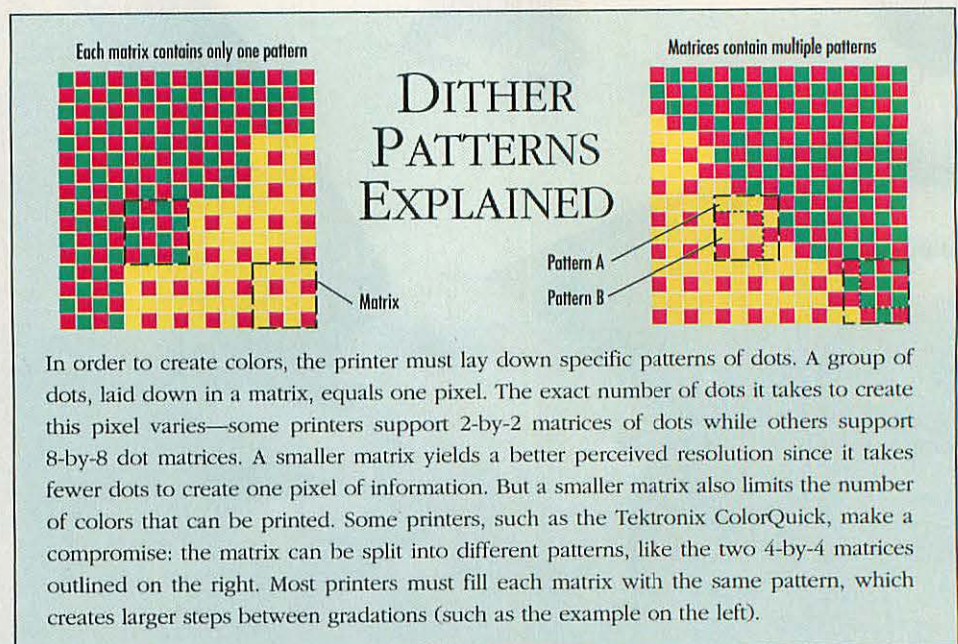
Of course, there are exceptions to every rule. Neither the Mitsubishi S340-10U ther-



**Tektronix ColorQuick**

mal-transfer printer nor the Canon FP-510 ink-jet printer use matrix dithering techniques. Instead they work more the way a traditional halftone process does, creating output with a very high perceived resolution.

The Mitsubishi S340 dye-sublimation printer uses a standard thermal-transfer engine but a different type of film and paper. The thermal head heats special film, which then releases dye onto photographic-type paper. Unlike the opaque wax used on most thermal printer films, the dye is translucent—dots of cyan, magenta, and yellow can be placed on top of each other. The temperature of the thermal printhead determines the amount of dye released. Thus each dot on the page can represent any color. Since no dithering is necessary, perceived resolution of this 150-dpi printer is far better than that of the best 300-dpi printer we tested.





Printouts from the Mitsubishi S340 contained smooth colors and images that came quite close to photographic quality; pixels weren't at all evident. But before you rush out to buy one of these gems, stop to consider the text quality. Text is definitely brown, not black, and individual characters are blurry and faded looking. At smaller sizes (around 12-point) text has a broken, cracked look.

The other unusual printer, the Canon FP-510, works by varying the size of the dots it prints. So instead of dithering 16 dots to create a light yellow, it might produce a few large yellow dots and a few small white dots (which are actually the paper and not really ink dots). This method produces colors using fewer dots than with dithering. As a result, the Canon FP-510's colors were pleasingly smooth and brilliant, although they did not have the real-life quality of the S340's. Text quality was good, on a par with other ink-jets. Unfortunately, due to a software driver that was not designed specifically for this printer, the Canon FP-510 produced the worst banding of all the printers—that is, images displayed distinct bands of color instead of blending smoothly from shade to shade.

## HARDWARE INSTALLATION

No matter what technology the printers used, getting them to produce their first color printouts was a fiasco. Most peripherals such as laser printers and hard disks have SCSI ports built in so they can connect directly to a Mac's SCSI port (this ease of connection is one of the Mac's strongest virtues). But because many of the printers were originally designed to work with IBM PCs, the Macintosh interface is an afterthought.

For instance, many printers have parallel interfaces that are incompatible with the Macintosh's serial or SCSI interfaces. To get around the problem, several of these printers require a special parallel board (like Creative Solutions' Hurdler II) to be installed in the Mac. Often the price of the board is not included in the list price of the printer. Even worse, some companies, such as Mitsubishi and Sharp, don't sell the necessary interface at all, forcing

the customer to purchase it from another vendor. Imagine buying a car without tires.

Odd collections of solutions to the interface problem abound. Calcomp's PlotMaster includes a box that converts the Mac's serial port signal into a signal the printer's parallel port can read. Since serial connections transfer print data more slowly than any other interface, however, Calcomp recommends that users buy a parallel board. Seiko's QD-5500 printer also comes with a converter box, but this one instead facilitates a faster, more convenient SCSI-to-parallel connection.

Only Tektronix's ColorQuick for the Macintosh offers a straight SCSI connection. Great, we thought, finally a color printer that's plug and go. But the ease of connecting this printer was marred by poor packaging. During transit, ink had spilled out of the reservoirs and created quite a mess. It turned out that a seal had slipped during shipping, a problem Tektronix claims to have fixed.

Still, the ColorQuick isn't easy (or quick, for that matter) to move. First off,

every time you shut down the printer it goes through a 60-second cleaning cycle. When you move the printer, not only must you put a seal on the ink reservoirs to keep them from spilling, you must also remove the cartridge that contains the cleaning fluid and replace it with an empty one. Otherwise, cleaning fluid could spill and ruin the printer. Sharp's JX-730, which uses the same Sharp engine as the one in the ColorQuick, has the same requirements as does Howtek's Pixelmaster. At least Tektronix does offer optional on-site service so you do not have to ship the printer if it malfunctions. Sharp leaves maintenance options up to its dealers.



Seiko QD-5500

## VIDEO PRINTERS

**V**ideo printers do exactly what their name implies—they print any image that a Macintosh can display. These printers hook up to a video board installed in a Mac II. Memory in the board stores any image displayed on the Mac's monitor. To print the image in color, just press a button on the printer.

These printers are fast and very easy to use. You don't have to fuss with software drivers or application incompatibilities. And they are excellent for oddball applications such as storyboarding multimedia presentations or printing digitized photographs in a hurry. The bad news is that you can't print an image without also printing the menu bars, icons, or cursors that appear on the screen when the image is displayed.

Of the video printers we tested, the Toyo TPG 4300 thermal-transfer printer offers the highest quality output and includes several handy features, such as support for B-size paper as well as the ability to rotate images and to magnify them in increments of .1 percent. Not surprisingly, this printer is the most expensive (\$12,500). The less-expensive Mitsubishi G330-70U (\$4495) is a reasonable second choice if you can't justify the high price of the Toyo.

Eastman Kodak's SV6510 (\$5100) takes a different approach. This printer produces 4-by-5-inch photographic prints using the dye-sublimation printing process. You can print TIFF, PICT, or PICT2 images. Even better, you can hook up a video camera, a digital camera, an RGB camera, or a VCR; display an image on the Mac; tweak it using color image processing software; and then print it. The quality isn't as good as it would be using a high-end camera, but you can still get quite satisfactory images for use in a newsletter or on photo identification cards.



## SOFTWARE

It is tempting to think that hardware alone determines what the final prints will look like, but the software that drives the printers can really make a difference in the quality of the printout. For instance, on color images with gradations, Hewlett-Packard's PaintJet produced very noticeable banding. Yet when I printed the same images using a prerelease copy of the PaintJet's new driver, much of the banding was gone (see "Software Makes a Difference").

The PaintJet's new driver offers better blending for two reasons: it is compatible with 32-bit QuickDraw and it offers a larger dot matrix. Only the drivers that are compatible with 32-bit QuickDraw let you print more than 256 colors at once. The exact number depends on the size of the dot matrix: a 16-by-16 matrix can produce 16.7 million colors; a 4-by-4 matrix produces 4096. So a smaller matrix or a smaller color palette provides fewer available colors and, therefore, larger steps in a gradation.

Likewise, printer drivers usually determine what sort of dither pattern is used to create the printout. One driver that several printers use, Cricket's Expression, offers

### Software Makes a Difference

*Hewlett-Packard's old software driver for the PaintJet produced a lot of banding (left), but the new driver eliminates most of the banding (right).*



users a choice of several different dither patterns such as Spiral, Bayer, and Nella. With a bit of experimentation, I discovered that ordered patterns such as Nella are generally best for bar charts, and newsprint patterns like Floyd/Steinberg are best for photographic output, although this can vary depending on the particular image. In some cases, I preferred one pattern over another simply because it produced an effect I found more pleasing, not because it offered any real resolution advantages.

All of the drivers are QuickDraw compatible and many of them are accessible by clicking on icons in the Chooser. PostScript printers from Océ, Tektronix, and QMS use Apple's LaserWriter driver.

These printers appear in a scrolling list in the Chooser when you click on the LaserWriter icon.

## QUICKDRAW INK-JET PRINTERS

Most of the printers we tested print only QuickDraw graphics and text. Of these, the ink-jet printers are less expensive than the thermal-transfer printers and in many instances produce better results. The least expensive printer, the Hewlett-Packard PaintJet, is the sturdiest, least fussy printer we tested, and it produced fine presentation-quality graphics when used with a prerelease driver. The PaintJet's quality on transparencies was as good as, and in some cases better than, that of some of the much higher-priced printers. The only real problem was that on dark, solid-color backgrounds each pass of the printhead produced visible lines, separated by extremely thin white spaces where the printhead had not struck the paper.

Both the Sharp JX-730 and the Tektronix ColorQuick produce good output with solid, sharp colors. Of the two printers, the ColorQuick has a software advantage because it includes Tektronix's TekColor software for matching screen colors to printed colors. TekColor replaces Apple's ColorPicker and displays two overlapping triangles—one representing the on-screen colors and the other representing the colors the ColorQuick can print. This system lets users adjust on-screen palettes for best color matching. When I used TekColor, my printed colors did match the screen colors much more closely. At the very least you'll be able to change the hues of printed colors noticeably using TekColor; most other printers'

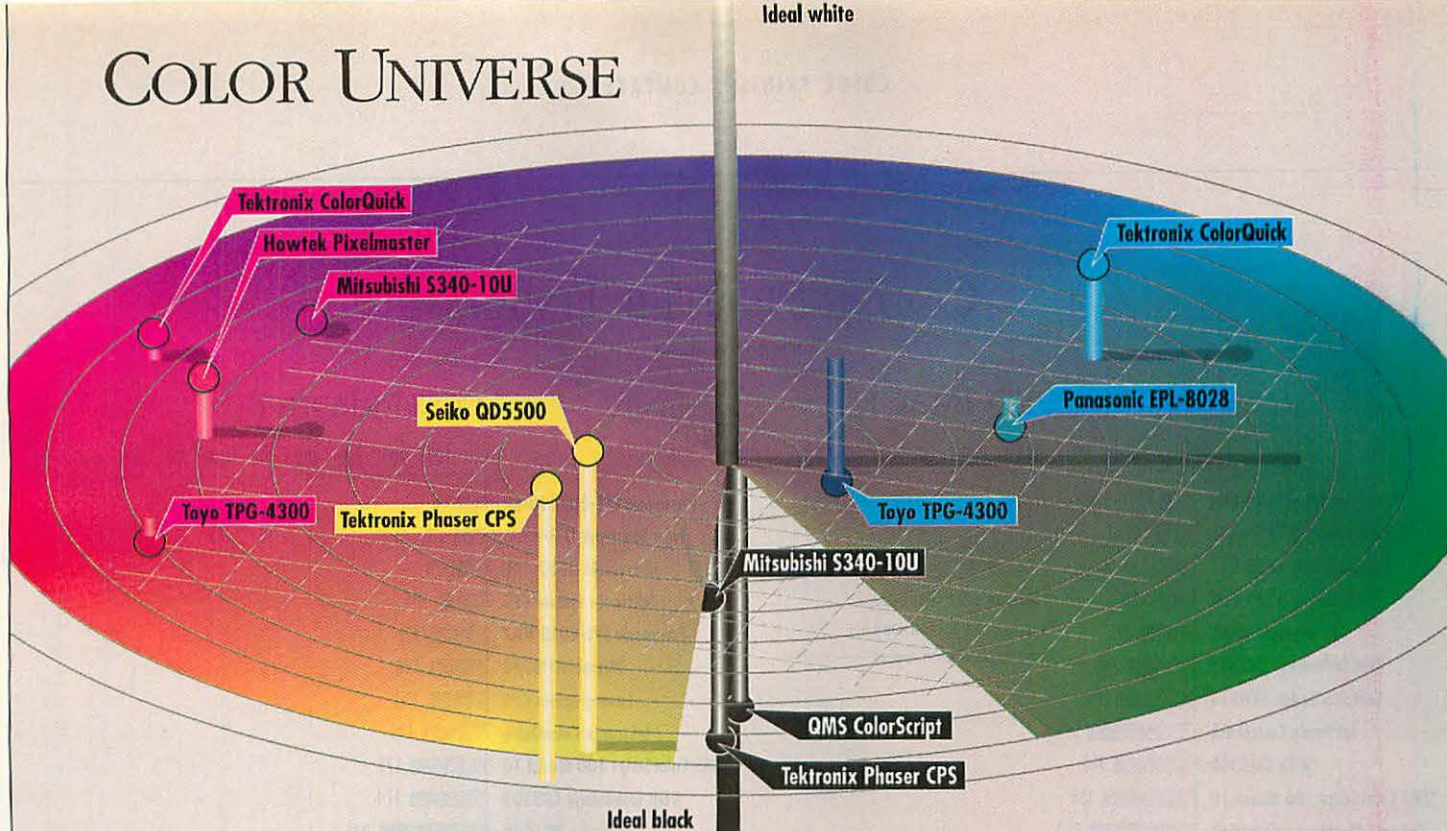
## VIDEO PRINTER FEATURES

	EPL-8028 NABR	G330-70U	SV6510	TPG-4300
Company	Panasonic	Mitsubishi	Eastman Kodak	Toyo Spectrum Corp.
Price *	\$7495	\$4495	\$5100	\$12,500
Options	multiplexer	no	no	multiplexer
Runs on AppleTalk network	no	no	no	yes
Resolution (in dots per inch)	200	150	140	300
Size of dither cell	2 x 2, 4 x 4, 16 x 16	2 x 2	n/a	4 x 4
Paper sizes supported	A	A	4 x 5 inches	A, B
Printable area on A size (in inches)	8 x 10	8 x 10.5	n/a	10 x 6.5
3- or 4-color ink sheets	3	3	3	3
Black-only ink sheet	yes	yes	n/a	yes
Cost per A-size page	\$0.57	\$0.46	\$1.12	\$0.42
Paper feed mechanism	rolls	cut sheets	automatic	rolls
Supports transparencies	yes	yes	no	yes
Warranty (in months)	12	6	12	12
On-site service	no	no	no	per-visit charge

\* Price includes all interfaces that are sold by the company needed to run printer.



# COLOR UNIVERSE



Macworld Labs used a Minolta spectrophotometer to measure the CYMK values that each printer produced. In this three-dimensional diagram, each color is represented as a point in the three-dimensional color sphere. The closer a point is to the perimeter of the central color plane, the greater the saturation. Lines that extend below the central color plane indicate darker colors; lines extending above the plane indicate lighter colors. The ColorScript produced the best black—closest to the center of the sphere (no tinge of color) and reaching farthest toward ideal

black (complete absence of light). The Phaser CPS also produced a solid black; the S340-10U's was the lightest. The best cyans included the TPG-4300's dark blue and the ColorQuick's highly saturated cyan. The Panasonic EPL-8028 produced the worst cyan—light and greenish. All the printers produced fine yellows; the Phaser CPS's yellow was the most saturated. Magentas ranged widely. The ColorQuick's magenta was very saturated, as was the Pixelmaster's more reddish rendition. The TPG-4300 didn't do so well, producing an orangish magenta.

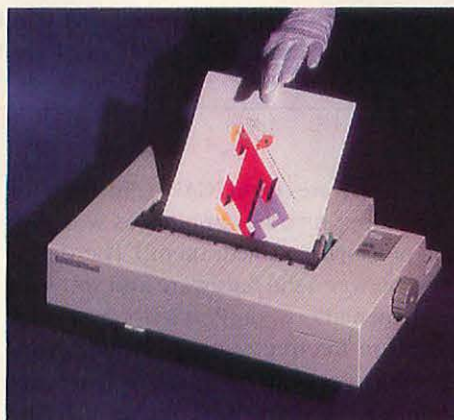
schemes for fine-tuning colors result in very subtle changes.

## THERMAL-TRANSFER QUICKDRAW PRINTERS

In the past, thermal-transfer printers produced some of the better-quality output. Now they seem to be falling behind competitors using PostScript, ink-jet, and thermal-transfer variations such as dye sublimation. In our tests, thermal-transfer QuickDraw printers as a group had trouble reproducing dark colors, often producing printouts with uneven quality.

The Panasonic EPL-8018 NA7 was especially troublesome—most printouts had white spots and the dither pattern was obvious. A couple of steps up were the Mitsubishi G370-10U, the RGB CB3203, and the Lasergraphics CPS. Still, the G370 had some banding problems and its colors

were not as accurate as many of the other printers. The RGB CB3203 had trouble printing dark colors that were distinguishable from one another. The CPS had many of the same problems as the Panasonic EPL-8018NA7, although to a lesser degree.



Hewlett-Packard PaintJet

Printers from Calcomp and Seiko fared better. Calcomp's PlotMaster uses the same engine as the Lasergraphics CPS but produced better output using the Cricket Expression driver. Overall, the colors on this printer came out lighter than on the other printers we tested; some colors appeared almost washed out.

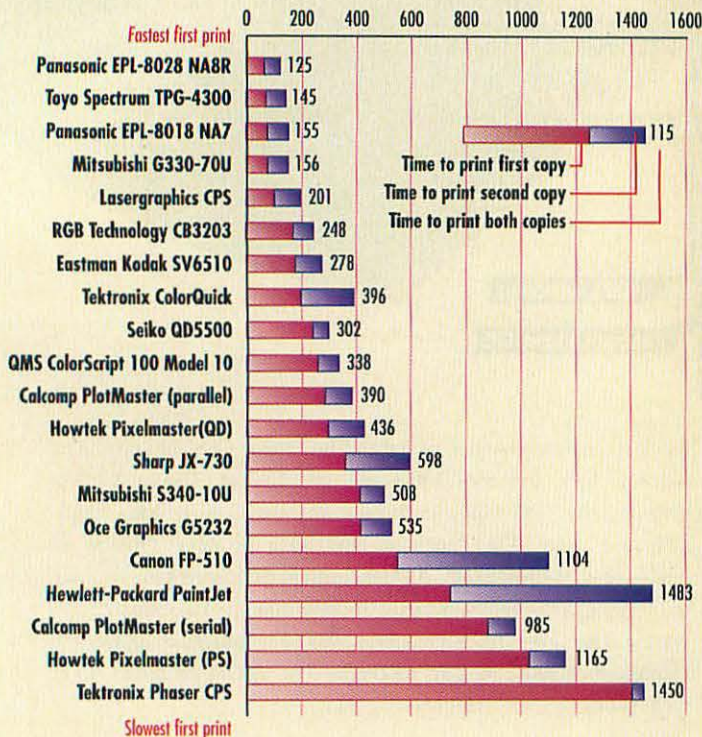
If I had to pick one printer without seeing any printouts, I'd grab the Seiko QD-5500. The attractive, compact case fits easily on a desktop, and the engine is amazingly quiet. The test unit produced some excellent printouts and some that showed problems. The dither pattern is less noticeable than on some of the other printers, making colors look more like—well, colors—than like colorful patterns of dots. Blends were quite smooth. Colors were not as accurate as on some other printers, however, and black text had a brown tint to it at smaller point sizes.



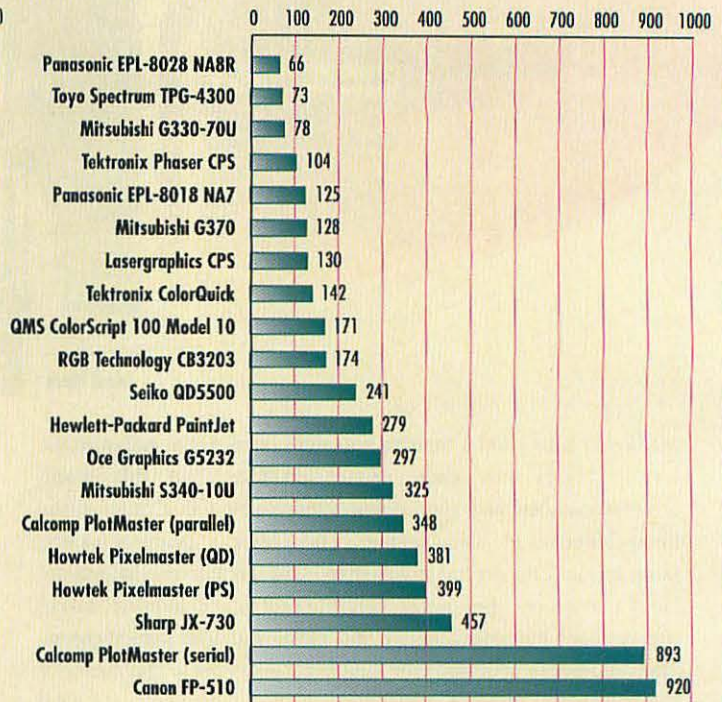
# COLOR PRINTER TIMES

Measured in seconds

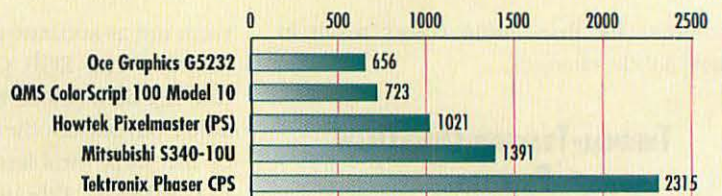
## BITMAPMED IMAGE



## POWERPOINT



## POSTSCRIPT IMAGE



No matter what type of image is printed, video printers are the fastest at printing a single copy. Printers with a serial interface (the Canon FP-510, the Hewlett-Packard PaintJet, and the Calcomp PlotMaster) are the slowest. Some printers—most noticeably the Tektronix Phaser CPS—spool images to the printer. Thus, even though the Phaser CPS has one of the slowest print times, the Mac is freed up within a couple of minutes, and printing a second copy of an image takes only about a minute. The Phaser CPS also speeds up on simple images such as a basic bar chart.

For PostScript images, printers from Oce Graphics and QMS are fastest overall; the Tektronix Phaser CPS takes the longest to get a

final print but returns control of the Mac quickly. The Howtek Pixelmaster and Mitsubishi S340-10U use Freedom of Press which takes the longest and hogs the Mac the whole time.

## POSTSCRIPT PRINTERS

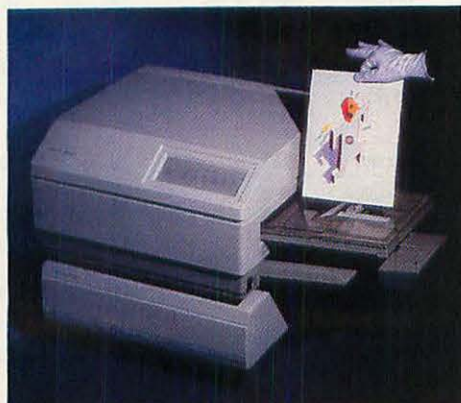
Several printers also produce PostScript output—some, such as the QMS ColorScript, the Tektronix Phaser CPS, and the Oce G5232 Color PostScript Printer, via a hardware implementation, and others, such as Howtek's Pixelmaster and Mitsubishi's S340, through Freedom of

Press software from CAI. (Freedom of Press supports other printers as well, but it is not included with them.) The difference between the hardware and software implementations of PostScript is that a hardware interpreter uses its own memory and processor to translate PostScript code into a bitmapped image that the printer can print. A software interpreter

must use the Macintosh's resources, which ties up the Macintosh much longer (see "Color Printer Times").

If hogging a Mac were Freedom of Press's only problem, you might be willing to make the trade-off to get PostScript output. But the program showed some rough edges, for instance leaving dark blotches in a PixelPaint Professional im-





**Tektronix Phaser CPS**

age. Plus, the program's design is clunky: to print an image, even a QuickDraw image, you must first capture it as a PostScript language file, exit the application, and open Freedom of Press. You must then select the image from within Freedom of Press and wait while the program interprets it and sends it to the printer. Unfortunately, Freedom of Press is the only driver available for the Mitsubishi S340-10U, rendering an otherwise excellent product nearly unusable.

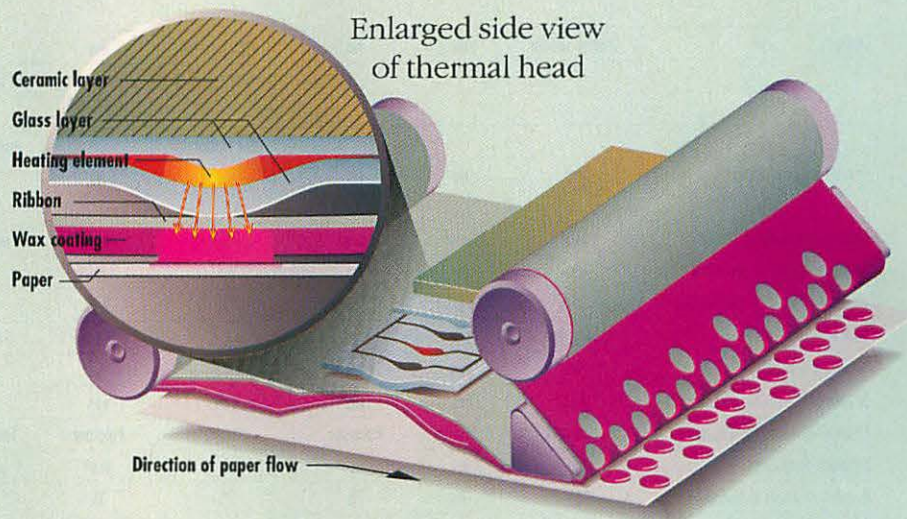
Howtek was smart enough to include a Chooser-level driver with its Pixelmaster ink-jet printer. When using this driver, the Pixelmaster gave the most consistent quality of all the printers tested. There were neither white specks in the printouts nor blots of color, colors came out brilliant—red was especially stunning.

The Pixelmaster is the only printer to use plain paper. Instead of water-based ink, the Pixelmaster uses rock-hard plastic pellets that melt and bond to the paper, leaving raised dots on the page and creating a nice embossed feeling. These ink pellets have one other interesting quality—they smell bad when melted.

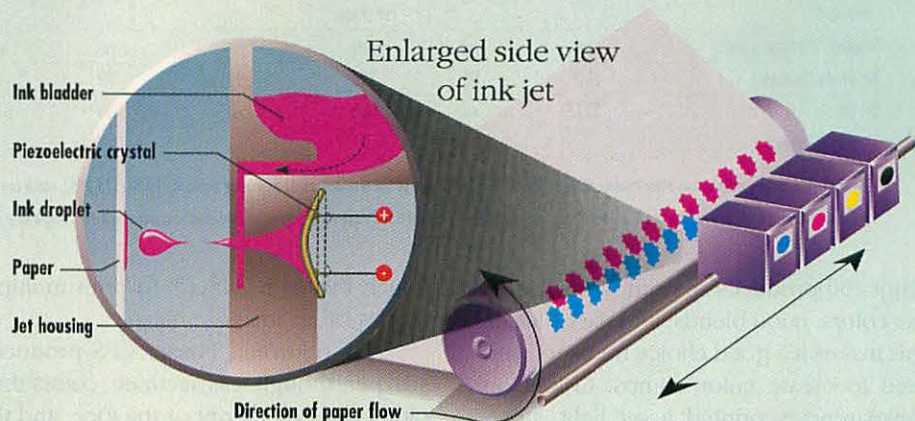
A close inspection of the Pixelmaster's printouts shows that this printer first lays down a solid base of color in a given area and then lays down groups of dots to define colors. For instance, on the orange drum in our PostScript image the background color was yellow. Dots of red and black were then laid down to create orange.

The QMS, Tektronix, and Oce printers were all easy to use and produced fine output. The Pantone-certified QMS Color-

## THERMAL WAX AND INK JET



A thermal-transfer printer uses a wax-coated ribbon that contains alternating page-size blocks of cyan, magenta, yellow, and sometimes black. (The Oce Graphics G5232 Color PostScript Printer is an exception—its ribbons are coated with plastic pigment.) The ribbon is sandwiched between specially coated printing paper and a thermal print-head. The thermal print-head presses the ribbon to the paper and applies heat selectively to melt the colored wax onto the paper in small dots. The printer repeats the steps for each color. Finished printouts are smooth and glossy.



Inside an ink-jet printer, a sheet of paper wraps around a drum. As the paper rolls, the printer forces ink from four reservoirs (one for each color: cyan, magenta, yellow, and black) through tiny nozzles on a print-head. The nozzles move parallel with the drum, producing lines of color until the image is complete. In a piezoelectric system—found in the ColorQuick, JX-730, and Pixelmaster printers—a crystal plate in the firing chamber vibrates and puts pressure on the ink, forcing it out of the nozzles. When shut down, these printers use a complex cleaning system that pumps maintenance fluid through the heads to keep them moist and clean. When switched on, the printers replace the cleaning fluid with ink. Other ink-jet printers, such as the PaintJet, don't need a pumping system; electrically generated heat causes the nozzles to expand and drop ink. The FP-510 can vary the size of nozzles based on the amount of electrical charge received.



## Ink-Jet Printers

## Thermal Transfer Printers

Product	ColorQuick Ink-jet Printer	FP-510	HP PaintJet	JX-730	Pixelmaster	4693DX	CB3203	ColorScript 100 Model 10 <sup>1</sup>	CPS	EPL-8018
Company	Tektronix	Canon	Hewlett Packard	Sharp Electronics	Hawtek	Tektronix	RGB Technology	QMS	Lasergraphics	Panasonic
Price <sup>2</sup>	\$2495	\$5255	\$1520	\$2195	\$8495	\$9450	\$6595	\$9995	\$7495	\$4395
Options	tractor feeder	no	no	tractor feeder cut sheet feeder	no	4MB PC interface	paper tray transparency spindle	1MB RAM <sup>5</sup> 4MB RAM	no	multiplexor
Special requirements	no	no	no	parallel board/ driver	no	no	no	no	no	Lasergraphics interface/driver
Type of interface	SCSI	serial	serial	parallel	parallel	parallel	parallel	AppleTalk	SCSI converter	SCSI converter
Runs on AppleTalk network	no	no	no	no	no	no	no	yes	no	no
Resolution (in dots per inch)	216	160	180	180	240	300	240	300	200	200
Size of dither cell	16 x 16	n/a	2 x 2	8 x 8	8 x 8	16 x 16	none, 4 x 4, 8 x 8	PostScript default	4 x 4, 8 x 8	4 x 4, 8 x 8
Supports QuickDraw	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Supports 32-bit QuickDraw	yes	yes	no	yes	yes	no	no	yes	yes	yes
Chooser-level driver (creator)	Tektronix	SoftStyle	Palomar	Cricket	Palomar	Tektronix	RGB	Apple	Lasergraphics	Lasergraphics
Supports PostScript	no	no	no	no	yes <sup>6</sup>	yes <sup>6</sup>	no	yes	yes <sup>6</sup>	no
Number of fonts included	35	0	28	35	35	12	0	35	8	8
Optional fonts available	yes	no	yes	no	yes	yes	no	yes	yes	yes
Paper sizes supported	A, A3, A4 legal, B, 12 x 18 <sup>11</sup>	A, A4	A, A4	to 16.5" wide	A, A4	A, A4, Special A4, legal A	A, A4 <sup>3</sup>	A	A	A, legal, A4, Special A4 A, A3, A4, B
Printable area on A size	7.39 x 9.89 <sup>11</sup>	up to 8 <sup>11</sup>	up to 8 <sup>11</sup>	13.6 <sup>11</sup> wide	8 x 10.5 <sup>11</sup>	8.1 x 8.1 <sup>11</sup>	8 x 9 <sup>11</sup>	8.1 x 9 <sup>11</sup>	7.8 x 10 <sup>11</sup>	7.72 x 9.5 <sup>11</sup>
3- or 4-color ink sheets/jets	4	4	4	4	4	either	3	either	3	3
Black-only ink sheet	n/a	n/a	yes	n/a	n/a	yes	yes	yes	yes	yes
Must replace all ink at once	no	yes	yes	no	no	n/a	n/a	n/a	n/a	n/a
Cost per A-size page	\$0.28	\$0.25	\$0.25	\$0.28	\$0.10	\$0.38	\$0.40	\$0.68	\$0.35	\$0.57
Paper feed mechanism included	cut sheets, rolls	rolls	continuous form, cut sheets	manual	cut sheets	cut sheets	rolls	cut sheets	cut sheets	rolls
Supports transparencies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Warranty (in days)	90	90	365	90	90	90	90	90	365	365
On-site service (price per year)	\$217	no	\$60	no	no	\$710	\$2000	\$1450	\$995	no

<sup>1</sup> The QMS ColorScript comes in two other models: Model 20 (\$12,995) has identical features but can be upgraded to the Model 30 (\$15,995), which can use tabloid-size paper and has a higher page-per-month duty cycle.

<sup>2</sup> Oce also offers an A/A-size printer for \$16,450.

<sup>3</sup> The Seiko QD-5500 comes in a variety of configurations from an A-size, single-user printer that does not spool images to an A/B-size, networkable printer that spools images.

Script 100 produces smooth, clean, accurate colors; good blends; and dark blacks. This makes it a good choice for users who need to create color comps. Colors on transparencies printed a bit light, however. The printer also crashed occasionally and had to be restarted.

The Oce G5232's output was similar to that of the ColorScript, although the Oce was better at making a transition from black to another color to create the illusion of shading. The ColorScript, however, did a better job of blending shades of the same color (for instance, moving from dark blue to a light blue or white). Plus, the Oce G5232 is loud, sounding like a lawn mower when printing, and its paper cutter must be operated manually,

which makes it difficult to print multiple copies of an image.

The Tektronix Phaser CPS produced sharper, though less accurate, colors than either the ColorScript or the Oce, and the Phaser CPS's dither pattern was less apparent. At first, the Phaser CPS showed more banding than the ColorScript or the Oce. But after I complained to Tektronix, the company's technical support staff sent me a special piece of software (free of charge) that fixed the banding problems. Presentations created on the

### Fine Presentations

The inexpensive Tektronix ColorQuick produces sharp colors and comes with software for matching screen colors to printed colors.

Phaser CPS are very eye-catching.

If I needed PostScript output on a regular basis, I'd opt for either the ColorScript or the Tektronix Phaser CPS. QMS offers several models of its ColorScript





G370-10U	G5232 Color PostScript Printer <sup>2</sup>	Phaser CPS	PlotMaster	QD-5500 <sup>3</sup>	S340-10U
Mitsubishi	Oce Graphics	Tektronix	Calcomp	Seiko	Mitsubishi
\$6795	\$17,950 <sup>3</sup>	\$12,995	\$5595	\$6995 to \$13,495 <sup>3</sup>	\$13,995
no	80MB hard disk	3MB RAM extra controller card	video controller	<sup>3</sup>	no
no	no	no	driver	no	parallel board
parallel	AppleTalk	AppleTalk	serial converter	SCSI converter	parallel
no	yes	yes	no	optional	no
300	300	300	200	300	150
4 x 4, 6 x 6, 8 x 8	PostScript default	PostScript default	8 x 8	8 x 8	n/a
yes	yes	yes	yes	yes	yes
yes	yes	yes	yes	yes	yes
no	Apple	Apple	Cricket	Palomar	no
no	yes	yes	yes <sup>4</sup>	no	yes <sup>4</sup>
0	35	35	35	35	35
yes	yes	yes	no	no	yes
A, A4, Special A4 legal	A	<sup>1</sup>	A, A4, Special A		
8.1 x 9 <sup>11</sup>	6.8 x 10.1 <sup>11</sup>	8.13 x 8.63 <sup>11</sup>	8 x 10 <sup>11</sup>	8.2 x 10.7 <sup>11</sup>	8 x 9 <sup>11</sup>
either	either	either	3	either	3
yes	yes	yes	yes	yes	no
n/a	n/a	n/a	n/a	n/a	n/a
\$0.60	\$0.41	\$0.38	\$0.35	\$0.76	\$4.80
cut sheets	rolls	cut sheets	cut sheets	continuous form	cut sheets
yes	yes	yes	yes	yes	yes
180	90	90	90	90	180
no	\$1566	\$1223	\$780	\$600-\$1200	no

<sup>4</sup> Prices include all interfaces that are sold by the company needed to run the printer.

<sup>3</sup> Legal/Special A4 sizes supported with extra 1MB of memory.

<sup>6</sup> Only with Freedom of Press software from CAL.

including the compact, quiet Model 10 and a bulkier Model 30, which prints on tabloid-size paper. The Phaser CPS is large and heavy, but the printer server box that houses the PostScript interpreter also allows the printer to be networked and it has a port for attaching a monochrome laser printer.

For users who need color PostScript only once in a while, I recommend checking out both the ColorScript Model 10 and the Pixelmaster. The Pixelmaster is large and has problems producing detailed images; but the colors are stunning, it uses plain paper, and it's not quite as expensive as the ColorScript. And it produces darker colors on transparencies than the ColorScript.

## CONSUMABLES

Once you buy a color printer you'll still be shoveling out money for special paper and ink or ribbons. For standard thermal-transfer printers, printing prices run about 50 cents per page; \$1 or more for transparencies. Images from the Mitsubishi S340 are even more expensive—the photographic-style paper and special film bring the price per page to \$4.80.

Most companies sell three-color, four-color, and black-only ribbons for thermal-transfer printers, although a few sell only three-color and black ribbons. Both three-color and four-color ribbons have cyan, magenta, and yellow panels; the four-color ribbons add a black panel. Without



### Smooth, Solid Colors

The Seiko QD-5500 printer produces smooth, solid colors, and has a compact design.

the black panel, a printer must dither cyan, magenta, and yellow to create black, which often produces slightly muddy text. Dithered colors also may not look as sharp without black. However, the three-color ribbons are handy for printing at faster speeds.

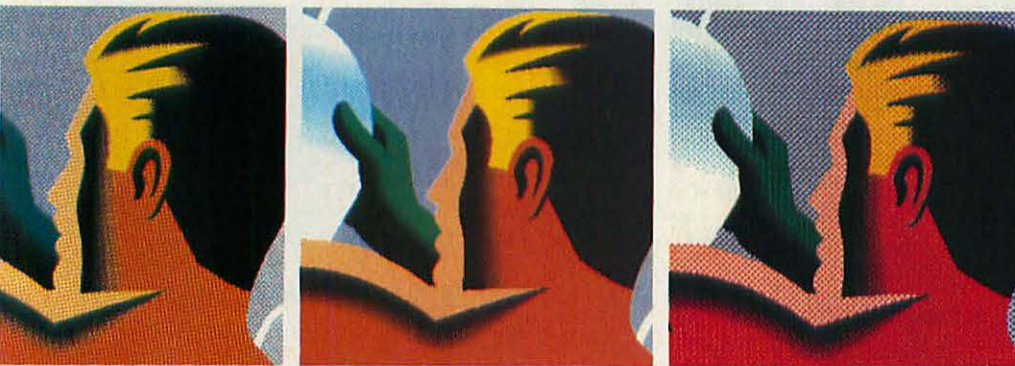
Except for the Oce G5232, which uses a plastic ink, all the thermal-transfer printers have wax-based ribbons. The waxes are rated to withstand temperatures of 150 degrees F or higher, but you may want to avoid using color transparencies on older heat-based projectors, just to make sure your image doesn't melt off the page in the middle of a presentation. Wax can also be scratched off easily, so take care not to gouge images with a pen or the edge of a notebook.

Some ink-jet printers allow you to replace each color ink as it is used; others make you replace a cartridge containing all four colors once one color has been used up. Except for the Howtek Pixelmaster, which uses plastic ink crayons, all of the ink-jet printers use water-based ink that smears when wet.

## SERVICE, WARRANTIES, AND MANUALS

Many of these printers cost as much as a Mac IIcx, and their warranties aren't much better than Apple's either; most run from three to six months. Some companies offer extended warranties and other service contracts, such as on-site repair. But you'll pay an arm and a leg for most of these services. RGB, for instance, charges \$2000 per year for on-site service.





### PostScript Printing

The same PostScript image printed on different printers yielded very different results. The QMS ColorScript (left) offers clean, smooth colors; the Mitsubishi S340-10U's printouts (middle) look almost photographic; and the Howtek Pixelmaster (right) printed stunning colors, especially reds.

To its credit, Tektronix charges only about \$200 per year for on-site service for its fussy ColorQuick printer. The company knows the printer is troublesome to move and doesn't want to gouge the customer for its own design decisions. Probably the best service deal, however, comes from Hewlett-Packard. The inexpensive PaintJet is built like a tank and offers a one-year warranty.

The PaintJet, and Tektronix's ColorQuick and Phaser CPS come with the most thorough manuals. The QMS ColorScript also offers a good manual; Calcomp's and Seiko's manuals aren't too bad, although you may have to search a bit for informa-

tion. The rest of the companies, however, either give you a mix of manuals not customized to the Macintosh version of their printer or else something that resembles a field service guide. With these folks, getting a printout often involves a lot of guesswork.

## THE FINAL DECISION

While many of these printers come close to the mark, only a few offer the right combination of quality, performance, price, and features to deserve a buy recommendation (see "Top Picks"). I was especially disappointed that so few companies have made their products fit well with the Mac. For instance, although the S340-10U from Mitsubishi produced nearly photographic output and the FP-510 from Canon produced the smoothest, most pleasing colors, I can't recommend these printers until the companies show more interest in creating a true consumer product. In both cases, software, interfaces, manuals, and support are clearly afterthoughts.

But all is not lost. The companies that have put a lot of effort into integrating their printers with the Macintosh—such as QMS, Tektronix, Hewlett-Packard, and Seiko—all have good, solid products to show for it. Perhaps they will soon be able to combine their Macintosh knowledge with technologically advanced hardware. And that will be some output to see. **M**

See *Where to Buy* for contact information.



Howtek Pixelmaster

## TOP PICKS

### Adobe PostScript Printers



#### QMS ColorScript

The ColorScript consistently produced images with clean, smooth colors, solid blacks, and well-defined text. It is reasonably fast and is available in several networkable models. Topped off with good manuals and support, the ColorScript is a winner.



#### Tektronix Phaser CPS

The Phaser CPS's colors are even sharper than those from the ColorScript, making them better suited for presentation graphics and for printing on transparencies. This printer has many of the same features as the high-end ColorScript Model 30, but Tektronix lacks an equivalent to QMS's compact, under-\$10,000 ColorScript Model 10.

### Presentation-Quality Printers



#### Hewlett-Packard PaintJet

If all you want to do is print color transparencies or other presentation graphics, then this inexpensive, sturdy printer is an excellent choice. A new \$2500 version (which should be shipping by now) supports B-size paper, a faster printing speed, and 32-bit QuickDraw.



#### Tektronix ColorQuick

Darker, more accurate colors give this printer an edge on the PaintJet. But the ColorQuick requires more care in use and isn't easy to move—unlike the PaintJet, this printer can't be knocked off a table and still work.

### Middle-of-the-Road Printer



#### Howtek Pixelmaster

Stunning colors and the ability to print on plain paper outweigh some of this printer's disadvantages (such as its large size and lack of network capabilities). I also liked the classy, embossed feel of the output.



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Please use this form to tell us, based on your experience with Macintosh products, which ones you believe deserve a World-Class Award. Choose only one product for each category; you don't need to vote in every category. Products must be Macintosh-compatible and they must be shipping by March 1, 1990. For votes to be counted, they must include: (1) manufacturer name, (2) correct product name, and (3) model number (hardware only). Please type or print legibly. All entries must be postmarked no later than March 15, 1990.

	MANUFACTURER	NAME OF PRODUCT	MODEL #
Alternative Mass Storage	1.		
CPU Upgrade	2.		
Digitizer/Scanner	3.		
Display—Black-and-White	4.		
Display—Color	5.		
Graphics Board	6.		
Hard Disk (80MB or Less)	7.		
Hard Disk (above 80MB)	8.		
Input Device	9.		
Micro-to-Mainframe Communications	10.		
Modem	11.		
Network	12.		
Printer—Color	13.		
Printer—Dot Matrix	14.		
Printer—Laser	15.		
Most Promising Newcomer	16.		

	MANUFACTURER	NAME OF PRODUCT
Business Accounting	17.	
Business Presentation Graphics	18.	
Communications—General	19.	
Computer-Aided Design (CAD)	20.	
Database Management	21.	
Desk Accessory	22.	
Drawing/Illustration	23.	
Education/Training	24.	
Game	25.	
Integrated Package	26.	
Micro-to-Mainframe Communications	27.	
Multimedia	28.	
Music	29.	
Networking	30.	
Outline Processing	31.	
Page Layout	32.	
Paint—Black-and-White	33.	
Paint—Color	34.	
Personal Finance/Tax	35.	
Programming Language	36.	
Project Management	37.	
Spreadsheet	38.	
Statistics/Math	39.	
Utility—Disk and File	40.	
Word Processing	41.	
Most Promising Newcomer	42.	



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CGC 2 - 32 bit board

Fastest Backup

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NetStream  
HFS Backup 3.0

Best Gray Scale



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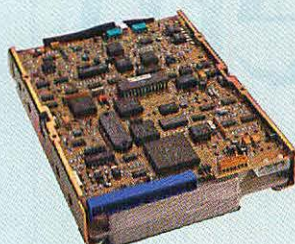
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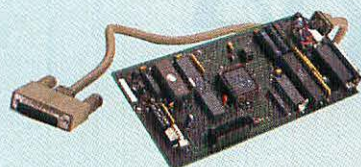
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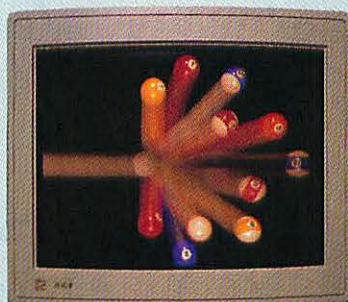
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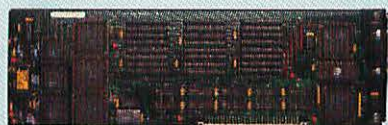
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Vue/GS30 display systems have a resolution of 1024 x 768 giving the user the ability for accurate on screen proofing. RasterOps is dedicated to the Apple WYSIWYG standard of 72 dpi compared to the non-traditional resolution of 1152 x 882, which is 30% smaller. Combining the features of a paper white screen phosphor, user controllable display parameters and 75 Hz flicker-free refresh, the ClearVue/GS system is ergonomically designed for long term viewing comfort.



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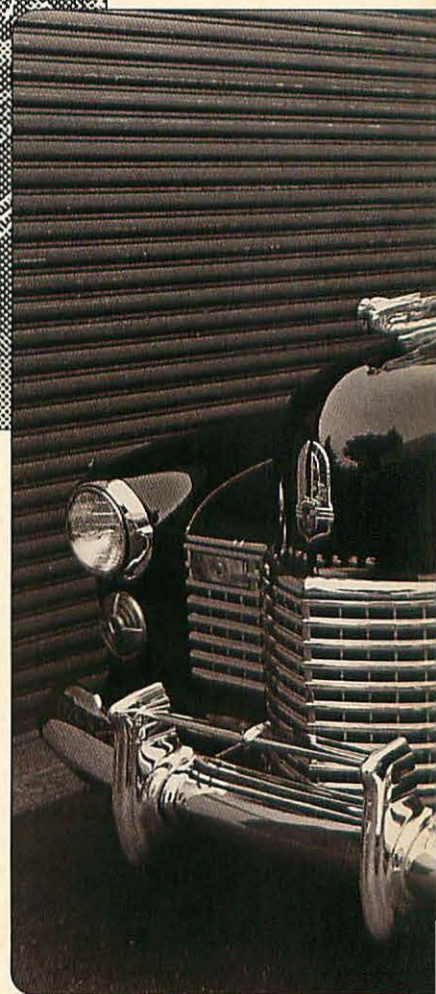


Gray scale performance is a luxury you can now afford and a tool you can't afford to be without.

If you are using anything less than 8-bits per pixel, you are not using advanced technology. Image Studio, Digital Darkroom and PageMaker, plus hundreds of other software applications, are based on 8-bit display technology. Monochrome displays do not take advantage of the technological evolution of the Macintosh and third generation software. One bit per pixel just isn't enough.

The ClearVue/GS display lets you see 256 shades of gray with true visual fidelity. What you see on the screen is 100% true to your hard copy output. The other leading gray scale display reduces the image to 92% of your actual output. The ClearVue/GS 19" display has a resolution of 72 dots per inch, an industry standard developed by Apple.

RasterOps' advanced technology gives you the big picture. With the Extended Desktop feature, you can expand your work area. Imagine being able to work on a document up to eight times larger without scrolling. Pop-up menus bring up the menu bar anytime you need it, anywhere on the screen. And the refresh rate of 75 Hz renders the display flicker-free for long term viewing comfort. With built-in hardware Pan and Zoom, you can see the details of your work two or four times larger than the original image and then zoom out with a single keystroke.







# REVIEWS



## ADOBE TYPE MANAGER 1.0

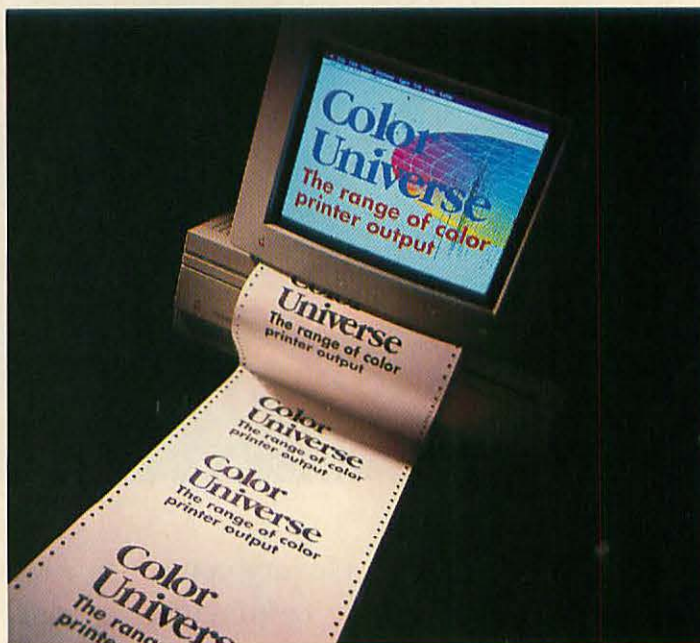
### Font-Optimizing Utility

**Pros:** Creates high-quality fonts for screen display and printing; saves disk space by cutting down on number of bitmapped fonts installed. **Cons:** Works only with Type 1 fonts; spacing problems with some fonts.

**Company:** Adobe Systems. **Requires:** Mac Plus. Hard disk recommended. **List price:** \$99.

**a** Do you suffer from the heart-break of jagged screen fonts? Are you sick of getting out your calculator to determine that you need to install screen font size  $x$  to print size  $y$  on a QuickDraw printer? Are you using your ImageWriter for a paperweight? Do you wish what you saw was really what you got? If you answered yes to any of these questions, you may be a candidate for Adobe Type Manager (ATM). Once you've seen this utility transform clunky screen fonts into smooth, readable type, you'll never want to look at the jaggies again.

ATM's benefits are twofold. One, it scales screen fonts to virtually any size, making text on the screen more closely match its printed counterpart and saving you the trouble of installing numerous bitmapped fonts. (ATM saves you disk space as well as trouble; we reclaimed between 24K and 30K of space per typeface by installing only 10- and 12-point screen fonts.) Two, the fonts that ATM creates are of such high quality that you can print good-looking text on QuickDraw printers such as the LaserWriter IISC or Hewlett-Packard's DeskJet, again without installing dozens of bitmapped fonts for the printer to scale. ATM even improves the quality of ImageWriter output.



ATM improves the appearance of text on a variety of printers, from the ImageWriter on up. Although ATM does a good job of scaling fonts, don't expect miracles when printing small sizes on a low-resolution printer like the ImageWriter.

Although ATM lets you print high-quality text on QuickDraw-based printers, it's not only for owners of these printers. PostScript printer users can benefit as well. For example, if you're trying to line up several text elements in Adobe Illustrator 88 (note: you need Illustrator 88 version 1.9 or higher for ATM to work), ATM can save the day by producing accurate character representations at any size. Likewise, if you're kerning character pairs or otherwise adjusting spacing in a page-layout program, seeing smoothly rendered characters on the screen can be a big help.

### A Smooth Operator

How does ATM work? You're probably accustomed to installing numerous screen fonts, the bitmapped characters that appear on the Mac's display. If you select a size that isn't installed as a bitmap, the Mac's built-in QuickDraw does its best to create a legible screen font (often with miserable results). To print the corre-

sponding typeface on a PostScript printer, you also need to install a printer font, also called an outline font. ATM uses both of these components, but it differs from the current setup in that you have to install only a single screen font size per typeface (Adobe recommends installing two screen font sizes for best results). ATM uses information in the printer font to scale the corresponding screen font to the size you select, producing a smooth, accurate screen font—within the limitations of the Mac's 72-dots-per-inch display—rather than a ragged approximation (see "Notice the Difference?").

ATM is installed as a CDEV; simply drag the ATM icon into the System Folder and restart. You can turn off ATM if you don't want to use it (although it's difficult to imagine why you wouldn't). You must also drag the appropriate outline fonts into the System Folder and install at least one screen font for each face you wish to use.



The ATM package includes screen and printer fonts for the original LaserWriter's fab four: Times, Helvetica, Courier, and Symbol. An additional package, the Plus Pack (\$198), offers Palatino, Bookman, New Century Schoolbook, Avant Garde, Zapf Chancery, Zapf Dingbats, and Helvetica Narrow. You aren't limited to these fonts, however. ATM works with any of Adobe's downloadable PostScript fonts, as well as font from vendors who have licensed Adobe's Type 1 font format (at this writing, the companies are Agfa Compu-graphic, Autologic, Linotype, Monotype, Morisawa, and Varityper). Unfortunately, you can't use ATM with fonts from other companies, notably Bitstream.

### The Several-Second Manager

We tested ATM with a variety of programs and printers, and encountered few problems. Speed was one. When scaling a block of text, ATM can chug away for several seconds. However, you can increase ATM's font cache size to improve performance. Adobe advises allocating 50K in the font cache for each frequently used font. Even with that amount allotted, screen redraw on a Mac II with 8MB of RAM was slow. Performance improved somewhat when 75K to 100K was devoted to each font.

We did find a few bugs and incompatibilities. The most significant problem was a discrepancy in letter spacing between screen display and ImageWriter output

using Microsoft Word 4.0. According to an Adobe representative, Word 4.0's lack of fractional character widths for non-PostScript devices was to blame for the spacing problem.

We ran across yet another spacing problem when we mixed Futura Condensed Bold Oblique, the font *Macworld* uses for captions, with Futura Condensed Bold in a single paragraph. Word spacing looked fine on screen, but PostScript-based LaserWriter output showed the oblique letter at the end of one word leaning precariously into the first letter of the next. While the aforementioned word spacing was no problem when the Futura sample was printed on a QuickDraw-based LaserWriter IISC, another problem occurred: the oblique *p* had an annoying habit of overlapping the letter to its right. Similarly, Adobe's Galliard put too much space after the *s* on screen and on QuickDraw printouts, but printed all right on a PostScript-based LaserWriter.

Some critics gripe about the fact that the screen representation of fonts begins to deteriorate at small point sizes—generally 8 or 9 points and smaller. To these people we'd like to issue this challenge: take a pile of bricks and try to build a chandelier. In other words, the imperfect characters at small sizes are a function of the Mac's 72-dpi screen resolution, not ATM. (The same reasoning applies to the complaint that boldface characters sometimes don't appear bold on the screen at



### Notice the Difference?

*As you can see from this before-and-after sample of 74-point Galliard, Adobe Type Manager improves the appearance of screen fonts.*

small sizes.) For the most part, text printed at small sizes on QuickDraw devices looks fine. You should be aware, however, that screen display and output from non-PostScript printers improves as font size increases, and diminishes as size decreases. If you're used to PostScript quality in the 6-to-14-point range, ATM might not live up to your expectations.

### Should You Invest in ATM?

So it's not perfect. But ATM's performance is impressive. It even scales fonts to fractional point sizes in programs that support them. Output from a QuickDraw-based LaserWriter IISC compares favorably to output from a PostScript-based LaserWriter (see "Upscale QuickDraw").

Once the smoke from the Adobe-Apple font wars clears, Adobe Type Manager is likely to be seen for what it is: a significant new product that radically improves the quality of screen fonts and the versatility of QuickDraw printers. System 7.0, which will support Apple's new QuickDraw outline font format, will undoubtedly steal some of ATM's thunder. But System 7.0 will require 2MB of RAM, while ATM requires only 1MB. And who knows how long it will take for font vendors to ship substantial quantities of fonts in the new format? If you want to bring high-quality fonts to a low-end printer, you could do worse than to shell out a G-note for Adobe Type Manager.

—Luis Camus and Erfert Fenton

See Where to Buy or circle 724 on reader service card.

The cat's pajamas

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### Upscale QuickDraw

*The above samples are in Adobe's Goudy at 7, 9, 12, 14, 18.5, 29, and 48 points. The one on the left was printed on a PostScript-based LaserWriter IINTX; the one on the right on a QuickDraw-based LaserWriter IISC via ATM. Hard to tell the difference, isn't it? Note the inclusion of a nonstandard point size (29) and a fractional point size (18.5).*



★  
THINK C 4.0

## C Compiler with Object Extensions

**Pros:** Fast compile and link; thorough support for applications, device drivers, XCMDs, and code resources; first-rate class library; good code quality. **Cons:** Project manager lacks MPW-style version tracking; resource-building tools weak. **Company:** Symantec Corporation. **Requires:** Mac Plus. Hard disk recommended. **List price:** \$249.

Since the appearance of Smalltalk more than a decade ago, developers have looked for a way to combine the clear advantages of object-oriented programming—design clarity and code reusability—with the efficiency of optimized procedural-language compilers. The best-known attempt at an OOP-development environment for the Mac is Apple's own Object Pascal; combined with MacApp, Object Pascal constituted the earliest "easy" development environment for Mac applications. In the rest of the programming universe (mainly IBM PC and UNIX-based systems) the prime example is C++, an object-oriented version of C which is itself one of the most popular languages among professional programmers.

Now the Mac world has an object-oriented C from a major software house: Symantec's Think C. (Think C is a subset of C++.) In itself, this would not be particularly newsworthy, but Symantec has done such a good job of implementing this language that Think C is likely to become a standard. In the words of one developer, "It's as if you designed an ideal programming language in a dream and woke up to find out someone had mailed you a copy." Let's outline the reasons for this enthusiasm, and also determine whether one or two details might have been left out of this version of the dream.

## Lots to C

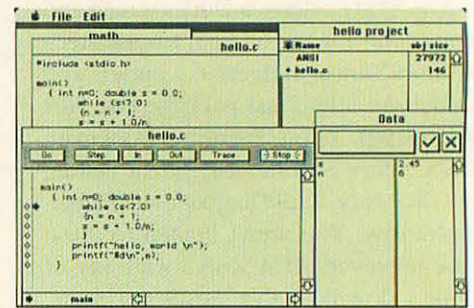
First, Think C (formerly called Think's Lightspeed C) has always been noted for its fast compiler, efficient linker, and well-designed project-management facility—

these are widely considered to provide the snappiest C environment available on any computer. One programming manager for a large corporation that has recently switched to Think C from MPW remarked that having the link-compile cycle speeded up by 20 percent to 40 percent is the equivalent of getting an extra programming day per week. Second, the Think disk set contains all the tools (including a source-level debugger, inline assembler, and profiler) needed to make working applications, device drivers, resources, and desk accessories from traditional procedural-style C programs (see "Eating Bugs"). Third, as of version 3.0, the code produced by the Think C compiler now can match or beat the code-size and execution-speed benchmarks of other Mac C compilers, particularly for large projects. Although Think C is still not completely ANSI compliant, Symantec has changed Think C to enhance its conformance to the standard.

The significant characteristic of interest in Think C 4.0 is not the familiar set of virtues but the novel object extensions. Symantec has integrated the object-oriented features in the style of C++ rather than Object Pascal. Whereas Object Pascal adds a new data type to Pascal, called class (loosely based on the concept of a record), Think C and C++ provide object-orientation by extending an existing data type called STRUCT.

Because Think C is a subset of standard C++, C++ code will generally not compile with the Think C compiler. On the other hand, Think C code is compatible with C++ compilers. This distinction is particularly significant, because Apple has announced a version of C++ for MPW. Think C is also different from C++ in that the Think compiler itself handles the new object-oriented programming constructs, whereas in classic C++ a pre-processor (a C++-to-C translator) prepares the code for delivery to a standard C compiler.

The value of the C language extension depends on ease-of-use and the quality of the included class libraries of objects. On the first point Think C has no problems. On a Mac II it can compile and link 500K worth of new project source code distrib-



## Eating Bugs

Think C's well-regarded source-level debugger lets you step through parts of a program, set breakpoints, and watch variables or expressions based on program variables in a view window. The source-level debugger cooperates nicely with the assembler- and machine-level debuggers MacsBug and TMON.

uted over 80 files of program main code and predefined objects in less than five minutes. If you make changes to a handful of objects, the project will recompile in ten seconds or so. On the second point Think C has no problems either. Gregory Dow has written a class library full of objects that are models of programming style (see "Showing Some Class") and that themselves offer facilities that allow fast and flexible construction of serious Mac applications. Several example projects, from simple programs with dummy menus to an almost full-scale MacPaint clone, are included as application frameworks and as tutorials.

## C for Yourself?

The catch is that, at least at the moment, there is no straightforward way to learn to use all this power. Think C's manual is outstanding as a manual, but the introduction to the concepts of objects, classes, inheritance, and polymorphism that it gives is excessively succinct. Kurt Schmucker's classic, *Object-Oriented Programming for the Macintosh* (Hayden Books, 1988), explains these concepts clearly but it uses MacApp for examples, providing only a few pages on C. *Macintosh Programming Primer*, by Dave Mark and Cartright Reed (Addison-Wesley, 1989), one of the easiest-reading Mac programming books ever written, explains the use of Think C "for the rest of us" but it was written before the addition of object facilities. Thus, if you (continues)



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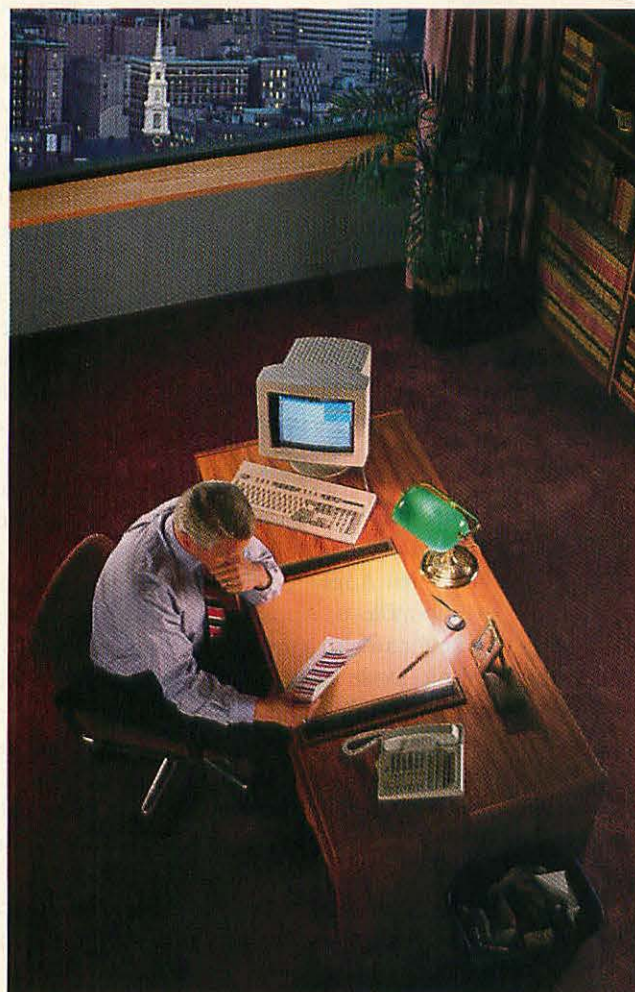
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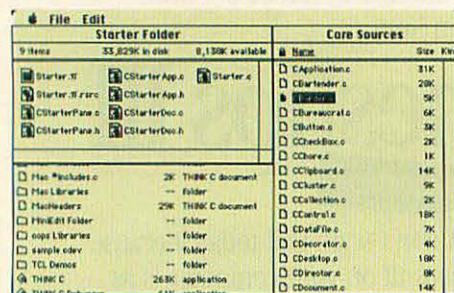
want to use Think C 4.0 as your first programming language, you will be obliged to learn it from a collection of partially overlapping sources.

If you are a professional programmer, I can recommend Think C 4.0 to you with only a few caveats. The final shipping version, after months of careful beta testing, still produces occasional unpredictable Out of Memory errors when operating under MultiFinder. Think C fails to provide some of the facilities that ease multiprogrammer development projects, specifically the source code version-marking built into MPW. Also, you must leave the Think C environment to create resources, by using either ResEdit or the archaic resource compiler. Because Think C is a new product, third-party class libraries (for example, Object Graf-Pak from Invention Software) are just now starting to appear. Users are also posting new objects to bulletin boards such as CompuServe.

Please understand, these complaints are minor. One could make a strong case that Think C 4.0 is the best compiler-plus-development-environment yet produced for the Macintosh. As an implementation of the goals of object-oriented programming, it has, quite amazingly, sacrificed none of C's traditional compiler efficiency; this compiler will be used to produce many commercially popular applications in the next few years. If, as countless authorities at Apple and elsewhere solemnly assure us, object-oriented programming is the inevitable wave of the future, Think C 4.0 is a reasonably priced and relatively friendly way to surf that wave.

—Charles Seiter

See Where to Buy or circle 851 on reader service card.



#### Showing Some Class

This screen shows some of the richness of the Think C class libraries, with objects for every occasion.

## MAC-101

### Macintosh ADB Keyboard

**Pros:** Crisp, responsive touch; good functionality when combined with bundled software.

**Cons:** Power-on push button instead of switch; non-standard layout. **Company:** DataDesk International.

**Requires:** Mac SE. **List price:** \$194.95

## MACPRO

### Macintosh ADB Keyboard

**Pros:** Excellent documentation; includes Tempo II software. **Cons:** Keyboard feels mushy; ADB cable permanently attached.

**Company:** KeyTronic.

**Requires:** Mac SE. **List price:** \$197.



Since the Macintosh started out with a detachable keyboard, it's odd that Apple took so long to decide to unbundle it. Apple itself now offers two keyboards that are compatible with the Apple Desktop Bus (ADB), and several third-party firms compete as well. Both the MacPro, from KeyTronic, and the Mac-101, from DataDesk International, have layouts similar to the Apple Extended Keyboard's (even imitating one of its worst moves—placing the Control key on the bottom row). Both also come with software that supports keyboard macros.

The MacPro, with 105 keys, includes an upper row containing the Esc key; 15 function keys; LED indicators for Num Lock, Caps Lock, and Scroll Lock; and a power-on switch (with LED indicating power-on status). There are two groupings of ⌘, Control, and Alt/Option keys—one on either side of the spacebar. Unlike the Apple Extended Keyboard, the MacPro has a large Return key and a small Shift key on the right side, with the vertical bar/backslash positioned under Return and to the right of the right-hand Shift key. On the far right, the MacPro has an 18-key numeric keypad, with large Enter and Zero/Ins keys. Between the alphanumeric section and the numeric keypad are 10 cursor-control keys: Ins/Help, Del, Home, End, Page Up, and Page Down, and below them the four arrow keys.

The MacPro keyboard itself has an ADB cable that's permanently attached at the back edge on the right. An ADB port (for a mouse or other ADB device) is in the middle of the back edge. Two adjustable legs let you use the keyboard in either a flat or a raised position. The MacPro package includes a 35-page manual, toll-free customer support, and a three-year limited warranty.

The MacPro also comes with Tempo II from Affinity Microsystems, a commercial software package that supports macros, action sequences that can be invoked with a keystroke or two. A sequence can include such actions as typing keys, moving and clicking the mouse, selecting menu items, and so forth. Tempo II also offers an autopaste function that allows you to save data (graphics or text) to the clipboard, and automatically paste it into a document when you press a specific key or key combination. The biggest drawback: Tempo II accesses your disk for even simple string macros. The program comes with a professionally done 120-page manual; a template that fits around the upper row of function keys can be purchased separately.

### Mac-101

With only 101 keys instead of 105, the Mac-101 is slightly different from the standard Apple layout. Missing are the power-on switch, the left Control key, the right Option key, and the Equal (=) key on the numeric keypad. The Mac-101 does have a button on the front of the keyboard that turns the power supply on, but since this button doesn't have an associated key code, it doesn't work with utilities such as the Programmer's Key INIT. There are three LEDs at the right end of the upper row for Caps Lock, Window Lock, and Power On. One nice touch: pressing the Esc key performs the standard Mac cancel function (⌘-period), while Shift-Esc summons the Undo command (⌘-Z).

Other features also differ from the standard layout. In the numeric keypad, the Plus (+) key is twice as tall, and a single key is used for both equal (=) and minus (-). The Clear key has Window Lock as an alternate function (invoked as Control-

(continues)



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**Mac-101 from DataDesk (top) and MacPro from KeyTronic (bottom) provide alternatives to the standard-issue Macintosh SE keyboard.**



Clear), which allows the keys to work on the active window, causing it to scroll, page, jump, zoom, or close. NumLock is enabled and disabled with ⌘-Clear.

In the cursor-control keypad, the two left keys are labeled Paste and Cut instead of Ins and Del. This last change makes sense; the keys generate ⌘-V and ⌘-X key codes and so perform their labeled functions with just about any application. Using Shift-Cut is the same as performing the Copy function (⌘-C).

The Mac-101 has two ADB ports in the middle of its back edge; you can use the supplied ADB cable or substitute one of your own. Two legs on the bottom let you choose between raised and flat keyboard position. DataDesk offers a two-year warranty; the only mention of technical support, however, is the number you call to return a defective keyboard.

Like the MacPro, the Mac-101 comes with software to enhance its functionality. MasterStrokes, a keyboard-extender program, comes with predefined sets of macros from MacWrite 4.6 and Microsoft Word 3.01 and even includes a function-key template for the MS Word macros. In fact, it's the MasterStrokes software that enables Mac-101's special Esc, Paste, Cut, and Window Lock capabilities. MasterStrokes doesn't have the extensive functionality of Tempo II, and its manual runs

only 22 pages, but the software does an excellent job of replacing mouse actions with keyboard equivalents and adds more versatility to the keyboard itself.

### Keyboard Action

In one very subjective area I definitely prefer the Mac-101 over the MacPro: keyboard feel. The Mac-101 has a clean, crisp feel—much like the Apple Standard Keyboard—while the MacPro feels mushier and less responsive. Typists often swear by (or at) the feel of their keyboards, so this factor can outweigh other considerations. If it's an issue for you, then you should try out a keyboard before purchasing, or buy from someone who'll give you an unconditional money-back guarantee).

Apart from feel, however, the MacPro is a somewhat better value than the Mac-101 in most other areas: appearance, Apple compatibility, documentation, and support. The Mac-101, however, offers some faster, cleaner shortcuts. Both keyboards are a better value than the Apple Extended Keyboard (which lists for \$229), and both offer better warranties (Apple's is only 90 days). In short, if you're buying a Mac, you should consider getting your keyboard from someone other than Apple.

—Bruce Webster

**See Where to Buy or circle 780 (Mac-101), 781 (MacPro) on reader service card.**

## TELEBRIDGE

### Network Bridge

**Pros:** Easy to install; supports individual remote dial-in users as well as network connection; includes program for setting parameters for unusual modems; handles speeds of up to 57,600 bps.

**Cons:** Serial and network ports not labeled.

**Company:** Shiva Corporation. **Requires:** Mac Plus; LocalTalk cabling; 2400-baud modem.

**List price:** \$499.

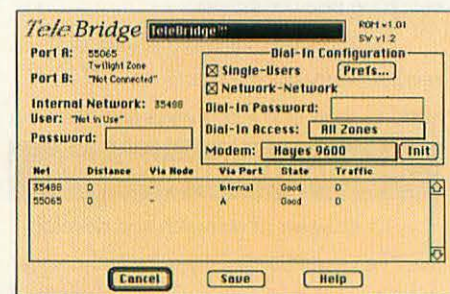


If your company occupies more than one building, is located in more than one section of town, or has offices scattered across the country, chances are you'll be looking for ways to link AppleTalk networks in different locations. The Shiva TeleBridge allows you to link two or more networks with either modems or dedicated lines.

### Setting Up

You need a TeleBridge for each network that you plan to connect. You also need a high-speed modem or a line driver (for connecting to a dedicated line) for each TeleBridge. Be careful—Shiva does not label the ports of its devices for your modem and network connections. You must refer to the manual to see which is

(continues)



### Getting Prepared

The Internet Manager lets you set zone names and passwords, as well as a name for the TeleBridge itself. In addition, you can restrict access to certain zones by clicking on the pop-up menu (labeled Dial-In Access) in the upper-right corner of the window. You can select two passwords—one for dial-in access, the other for making changes in the TeleBridge configuration. The lower half of the window displays the status of the network.



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Ad 020026

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the modem port and which is the network port. Once you have connected the modems to the TeleBridges and attached the TeleBridges to the existing AppleTalk networks, you are ready to configure the TeleBridges.

Each TeleBridge must be instructed about the existence of the others. You use the Shiva Internet Manager to assign names to the TeleBridge and configure zone names and passwords for both dial-in and administrative security. Shiva now provides the same configuration software for all its network devices, such as the NetModem, NetSerial, and NetBridge (see "Getting Prepared"). Shiva includes a series of predefined modem-control files for the most popular high-speed modems (see "TeleBridge Modem-Control Files"). But if your modem is not on the list, you can use the Shiva Modems program to define a modem file of your own.

If you want your TeleBridge only to receive calls, that's all the setup needed. On the other hand, if you're going to initiate links by calling another TeleBridge, you must also use the Shiva Config CDEV in the Control Panel to complete the setup. Like the Internet Manager, the Shiva Config CDEV allows you to select from predefined modem-parameter files to match the modem you're using.

### Linking Up

The Shiva Config file stores the names and phone numbers of all the TeleBridges you have access to. To initiate a connection, you select the name of the desired TeleBridge and click on the Connect button. A dialog box informs you when the connection between your network and the target network is complete.

Once the two TeleBridges have connected, all networked devices on the two networks operate as though they're on one big network. It's advisable to assign one zone name to the network with the first TeleBridge and another zone name to the network with the second TeleBridge so that users will know which network devices are local and which are remote. After all, you don't want someone tying up the telephone lines printing to a remote LaserWriter when there's one available locally.

You can configure the TeleBridge to disconnect an infrequently used link automatically if there is no activity for a specified amount of time. That way you can keep your telephone bills under control, even if you have a tendency to forget about the connections you've made.

### Staying Secure

Almost anyone with a network that accepts dial-in connections worries about data security. In addition to having TeleBridge ask for a password from dial-in users before completing a connection, you can configure TeleBridge to restrict both caller and callee access on a zone-by-zone basis.

There are three choices for zone control in the Internet Manager: All Zones, Local Zone Only, and No Zones. All Zones is pretty self-evident. Local Zone Only (My Zone Only in Shiva Config) means that you can see and use only devices in the same zone as the TeleBridge (or your Mac). No Zones (My Mac Only in Shiva Config) prevents remote access to the network; users on other networks can access your Mac only after the link you initiate is completed.

### Working on the Road

If you want to access the home office's network using the TeleBridge, you need



TeleBridge from Shiva Corporation

only a modem and Shiva's Dial-In Access software (the same software provided with Shiva's NetModems and NetSerials). Select the home office's telephone number from the list in Dial-In Access, dial, and when the TeleBridge answers the phone, you become part of the network. In order to make the same link using the Hayes InterBridge, you would need to have two InterBridges—one on each end of the call.

### Keeping the Link

The TeleBridge is unquestionably a worthwhile purchase if you need to link two networks via modem. At \$499, it provides all the remote networking functionality of the InterBridge—but at a lower price—and it simplifies dial-in access for individual remote users as well. It's easy to set up, and it's a stable product (I've had no problem using it routinely with a Hayes V-series Smartmodem 9600).

On the other hand, Infosphere's Liaison offers the same network functionality as the TeleBridge but in a software-only product that costs less (\$295) and runs in the background. The TeleBridge, however, offers the advantage of being a hardware box that you can stash away in the telephone closet along with the modem and that isn't subject to the Mac crashing.

For a phone-based link between networks that also supports individual dial-in access, I recommend TeleBridge. It works well and is a reliable network product, maximizing uptime between networks.

—Dave Kosiur

See Where to Buy for contact information.

## TELEBRIDGE MODEM-CONTROL FILES

Vendor	Product
Various	Hayes compatible
Hayes Microcomputer Products	Smartmodem 2400
Hayes Microcomputer Products	V-series Smartmodem 9600
Microcom	AX/9624c
Microcom	QX/V.32c
Practical Peripherals	Practical Modem 2400
Telebit Corporation	TrailBlazer Plus
Universal Data Systems	UDS V.32
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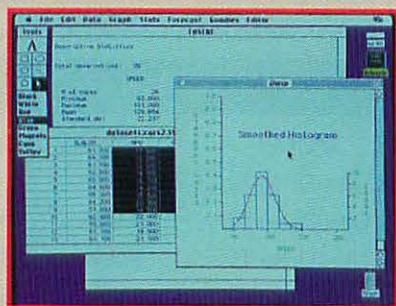
The company that brought professionals "the best statistics package on the Macintosh"\* introduces the *easiest*: FASTAT. Designed just for the Macintosh, FASTAT makes high-powered, accurate statistics easy.

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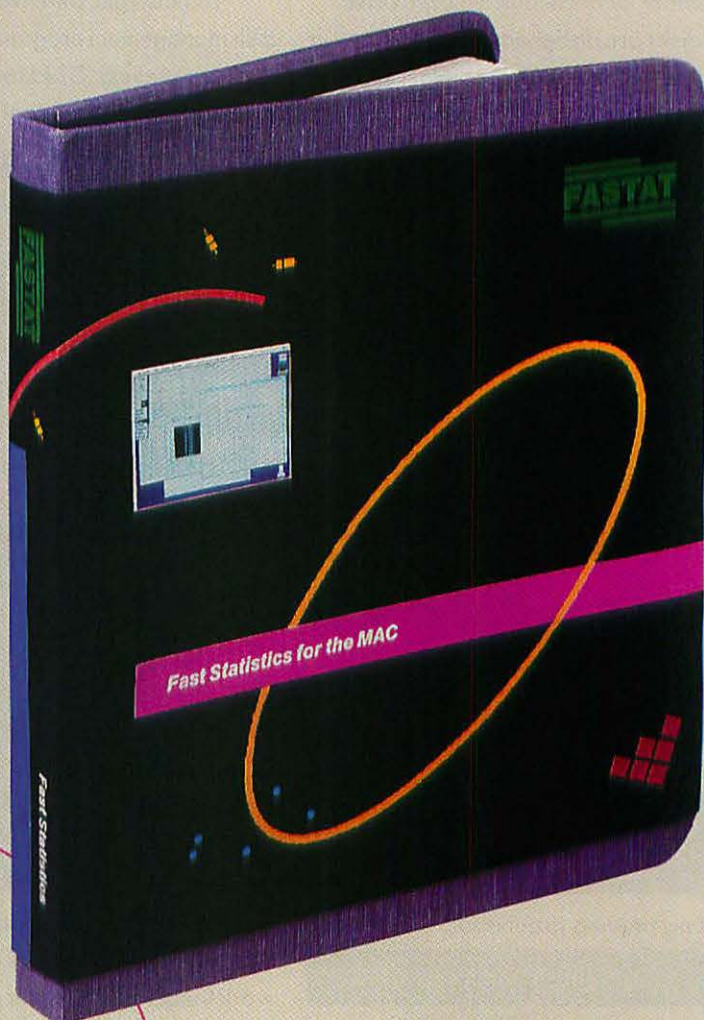
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Dealers circle 492 on reader service card  
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\*MacWeek September 13, 1988

\*\*Suggested Retail Price



## LANGUAGE MASTER PERSONAL COMPUTER DICTIONARY AND THESAURUS

### Dictionary and Thesaurus Desk Accessory

**Pros:** Convenient. **Cons:** Lacks spelling checker; definitions are too short; inconsistencies between dictionary and thesaurus. **Company:** Franklin Software. **Requires:** Mac Plus. **List price:** \$99.

## MACPROOF 3.2.1

### Style Checker Desk Accessory

**Pros:** Customizable; incorporates useful writing tips and analysis tools. **Cons:** Can flag only problem words and phrases, not constructions. **Company:** Lexpertise Linguistic Software. **Requires:** Mac Plus. **List price:** \$195.



While some software developers compete by incorporating more features into their word processing packages, others devise add-ons with features not found in even the most sophisticated programs. Two such add-ons are Language Master, an online dictionary and thesaurus, and MacProof, a spelling and style checker. Both are desk accessories offering unique capabilities for users of a variety of word processors.

Language Master does a lot more than just let you check the spelling of a word and make suggestions if you have spelled it wrong. It also presents definitions for each word; lists the different inflections, or forms, of the word; shows the appropriate hyphenation; and can provide a list of synonyms.

### Concise, Concisely, Conciseness, Concision

When you activate Language Master, a new heading appears in your word processor's menu bar. Highlight a word and then select Lookup Definitions from the LM menu, and a window opens with the definition of the word. The manual characterizes the definitions as concise—that's an understatement. In many cases the definitions aren't even as substantive as

those found in a pocket dictionary. They provide only a sense of a word's meaning and not a clue as to usage, making the program more appropriate as a reading tool than as a writing tool.

Language Master's thesaurus contains only 40,000 entries compared with the 80,000 in its dictionary, but it provides meatier definitions. For example, the dictionary's definition of *discern* is "discover with the eyes or the mind"; the thesaurus offers "1) to take cognizance of by physical or mental vision; 2) to recognize the differences between." It's easy to hop back and forth between the thesaurus and dictionary windows by clicking on a radio button, so if the dictionary definition is not sufficient, you can see what the thesaurus has to say (see "Language Master Window").

What it has to say, however, can sometimes be baffling. For example, according to the thesaurus, one synonym for the verb *droop* is *trollop*, but if you click on

trollop and then on the dictionary radio button you are presented with a single definition, "untidy or immoral woman."

With its skimpy definitions and lack of usage notes, Language Master does not meet my needs as a writer's tool.

### Spelling-Checking Plus

Unlike Language Master, Lexpertise's MacProof does have the capability to check spelling throughout a document, and it can also check for punctuation problems, such as a space before a period, and double words. Other programs do all of those things, but what MacProof does uniquely is help you look for the more amorphous problems of style and usage.

Before running a document through MacProof, you select which problems you want it to look for—Wordy, Imprecise, or Offensive usage, for example. The program will then scan the selected text for the terms and phrases that have been identified in its database as potential problems, stopping at each match to give you a chance to change it. MacProof can only flag the potential problems, however. It is up to you to look at them in context and decide what to do. For example, when MacProof examines your document for words that are often confused, it will alert you each time it finds words like *affect* or *effect* and display a message about their appropriate use, but it requires you to decide which one to use.

You can delete terms from the usage database so that they will no longer be flagged, and you can also designate terms for MacProof to flag. This is MacProof's most valuable feature, because it lets you check for bad habits that you or someone who writes for you might have and lets you customize the program for a particular house style (see "MacProof Window").

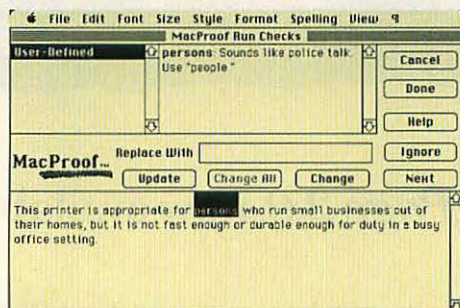
MacProof does not pretend to be a grammar checker. It does not possess artificial intelligence techniques that would enable it to parse a sentence, so it can't tell you if you have used a plural form of a verb with a singular subject. It also cannot identify potential problems that involve such things as numbers or passive constructions where the exact wording may vary from context to context.

(continues)



### Language Master Window

By clicking on a synonym of a word in the definition box and then on the Dictionary radio button, you can call up a dictionary definition.



### MacProof Window

MacProof lets you turn your linguistic pet peeves into formal sanctions. As MacProof runs, the text it is checking is displayed in the bottom half of the window. Advice on style and usage is displayed above.



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## Constructive Criticism

MacProof offers solid style and usage advice, often with examples of how to use a particular word or suggestions for other, more suitable words. Real editing, however, isn't a matter of simply exchanging words or phrases; often it requires rewriting or rearranging sentences. Although MacProof will let you replace any part of the sentence in which a phrase is flagged, if your change involves another sentence, it must wait until you are out of MacProof.

MacProof has an Analyze Structure option that lets you view all or part of your document in various ways. You can, for example, list each sentence individually, highlight just the first word of each sentence, or display just the first and last sentence of each paragraph. These different views can help you examine the flow and organization of your text. You may find, for example, that you start most sentences in a business letter with "I."

As an editor who fine-tunes other people's writing, I found MacProof to be of little help because it can handle only a fraction of the errors and idiosyncrasies I look for. As a writer, however, I found the program to be more useful, because by the time I am on my final draft, I am too close to my work to see it objectively. And that's exactly what MacProof was designed to do.—*Gerry Lukos*

See Where to Buy or circle 777 (Language Master), 782 (MacProof) on reader service card.



## SHANGHAI 2.0

### Strategy Game

**Pros:** Challenging; new digitized sounds and magnificent color; 3-D view; more play features.

**Cons:** None. **Company:** Activision.

**Requires:** Mac Plus. Mac II recommended.

**List price:** \$29.95.



Shanghai was popular for years in its beautiful, starkly elegant black-and-white version. With the advent of the Macintosh II in 1987, some Shanghai addicts had to leave the game behind—it wouldn't run on the II. Now it has been revised and redesigned,



### Dragon

*One of the three beautiful backgrounds in the new Shanghai. This one is stylized; the others are more realistically rendered.*

with enhanced sound and brilliant color, in a new version for the Mac II that is more than just an update.

### But First . . .

A brief summary of the game's basics is in order for newcomers to Shanghai. The premise is simple: you are presented with a pyramidal stack of 144 mah-jongg tiles, known as the dragon, and you try to remove all the tiles from the board by matching pairs. Only tiles that are unblocked—that is, not hemmed in sideways by other tiles at the same pyramid level—can be removed. It's one of those games that are easy to learn and take forever to master; play is simple, but strategy is complex. As with chess, it's necessary to look several moves ahead and plan carefully. The tile arrangements are randomized; some games can be won, others can't (unlike GunShy, a takeoff on Shanghai, which has all winnable games).

A beginner's first few games will seem slow. There are seven suits of tiles—seasons, winds, dragons, dots, flowers, *bams*, and *craks*—and it takes a while to learn to distinguish some of the patterns, though having the tiles in color greatly facilitates recognition. (Later, when a player has developed familiarity with the patterns, the tiles' colors make it easier to quickly scan the dragon for matching pairs.) You can walk through a trial game or two by repeatedly picking Show All Moves from the Help menu. Selecting Strategy, also under Help, brings up a set of brief but indispensable tips.

An additional help is the pop-up dia-

log box that appears when there are no more pairs of tiles to remove.

### Like an Intricate, Colorful Tapestry

Shanghai 2.0 could easily win any "Most Beautiful Game" award. Most of the tiles are vividly colored and slightly redrawn for added clarity. When you click on a tile, its pale gray background color changes to a deep turquoise; season tiles have tiny landscapes that appear to go from day to twilight with a click.

Another aesthetic enhancement is that the stack of tiles is displayed three-dimensionally, complete with shadows. This changes the play a bit. In particular, as you remove tiles from the taller stacks (not especially advisable strategically) the lower tiles at the sides become more and more hidden by the stack. It's a trade-off: having some tiles partially hidden makes it harder to find matches at a glance, but the realistic perspective makes it easier to see what level each tile is on. You can shift-click on a partially hidden tile to see it in full. The shadows can be toggled on and off; removing them takes away a little 3-D realism, but helps the play.

### Many Dragons

Another new feature is backgrounds—you can choose Tiger, Pavilion, or Dragon (or No Background). Then as you play, removing tiles exposes a striking color picture (see "Dragon"). Shanghai is a dragon-intensive game: besides the handsome green fire-breather, the stack is called the dragon, one background is a dragon, and one of the suits is dragons. Old Shanghai hands will be eager to win a game and see what's been done to enhance the brief animation of a fire-breathing dragon, which appears as a reward for winning. The new, enhanced dragon breathes hot-looking orange-and-red fire.

Shanghai is a challenge that requires visual concentration, skillful strategic thinking, and a bit of luck. It can be especially demanding in the tournament mode, where moves are timed. On the other hand, it can serve as pure brain-relaxation, like solitaire. In its new sound-and-color version, Shanghai is a work of art and an excellent game.—*Felicity O'Meara*

See Where to Buy or circle 824 on reader service card.



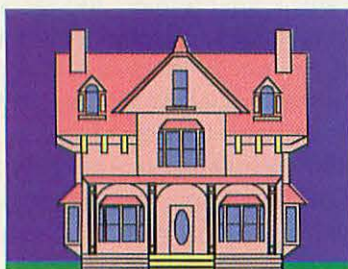
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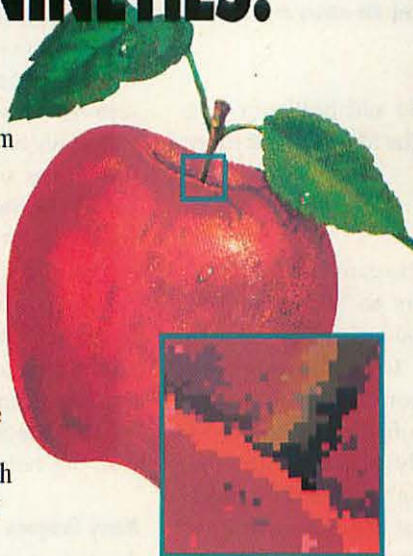
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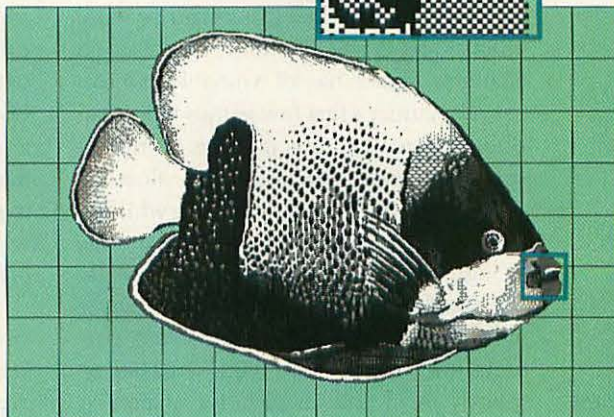
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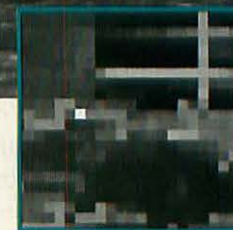


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★  
BLUEPRINT 1.0

## CAD and Drafting Package

**Pros:** Simple, straightforward interface; good documentation. **Cons:** Poor layering techniques; lacks powerful dimensioning tools.  
**Company:** Graphsoft. **Requires:** Mac 512KE; System 6.0.2. **List price:** \$449.



Competing with Claris CAD and Dreams for a portion of the 2-D CAD drafting market, Graphsoft recently introduced Blueprint. Blueprint comes from the same people who brought you MiniCad+, which explains why the two programs have many similar features.

**Drafting Features**

The first priority of any CAD package should be to allow you to draw with ease and precision. Blueprint's drawing tools are similar in many ways to those found in other CAD packages. Although Blueprint's floating tool palette contains a limited number of icons, its functionality is comparable to that in other programs since many of the Blueprint tools contain multiple options. For example, when selecting the line tool from the palette, you can toggle between constrained and unconstrained lines by holding down the mouse button and selecting the appropriate pop-up icon. The circle, arc, and rectangle tools, and many others have multiple creation modes. There's also a freehand tool for quick sketching.

With the appropriate drawing tool, choosing a tool modifier from the constraint palette enables you to precisely enter an object into an existing drawing. Objects can be constrained by grid, object intersection, or distance to create perpendicular, parallel, angular, and tangent lines. Unlike competing 2-D CAD programs, Blueprint has keyboard equivalents for all constraint palette items, so you can tidy the screen by closing the palette.

Layering is another important feature in any CAD package. Bound only by memory and disk space, Blueprint allows an infinite number of layers, and non-active layers. Although the layering fea-

ture is useful, you will have to get used to creating a drawing whose objects share the same layer. Blueprint prohibits you from putting objects on one layer and dimensions on another. Dreams has this same layering limitation, but Claris CAD allows a layering technique similar to that in most high-end packages and main-frame CAD systems. Even with its weak layering techniques, Blueprint lets you change the active layer on the fly by selecting the appropriate layer name from a hierarchical menu instead of drudging through a dialog box every time. Both Claris CAD and Dreams lack this feature.

Blueprint can duplicate objects in both polar and rectangular coordinates, and you can scale copies of an object, creating a perspective effect easily and quickly. Hatching, trimming, and filleting commands are included in Blueprint. However, some elementary drafting features such as chamfering were omitted.

A third area of concern in any 2-D CAD package is dimensioning. Blueprint allows only associative linear and angular dimensioning. Blueprint's ability to keep dimensions associative is a real plus; when you update a line's length by dragging, the dimension associated with that line automatically changes to the new length.

Although Blueprint lacks a symbol library like Dreams', Blueprint's comprehensive symbol-creation technique allows you to create your own library of frequently used objects. A complete translation package allows the import and export of DXF version 10 and PICT formats. In

addition, drawings can easily be exported into page-layout programs via encapsulated PostScript.

**Track Performance**

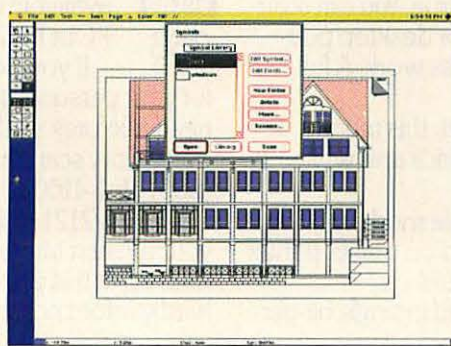
Blueprint performed without difficulty on drawings up to 120K using a Mac Ix with a 19-inch monitor and a 13-inch monitor, an 80MB Apple hard disk, a Pinnacle Micro Optical Disk, and 8MB of RAM. Blueprint requires at least 1MB of RAM on a Mac 512KE using System 6.0.2 or greater. Those who have a Mac II with a 19-inch color display will need 2MB. When a 300K file with 100 layers was brought in from AutoCAD release 10, Blueprint slowed dramatically and exhibited signs of strain; screens couldn't easily redraw after zooming or panning even though the program had 4.5MB of RAM according to the Finder. As in MiniCad+, screen redraws in Blueprint are forced after some dialog boxes are closed. This slows down the drawing process, especially with large files.

Blueprint's documentation is as easy to use as the application itself. Each feature is outlined in detail with accompanying illustrations, so you don't need additional reference books, quick charts, or tutorial outlines.

**Drawing the Line**

Both Blueprint and Dreams offer a version of the Microspot plotter driver separate from the main package, whereas Claris supplies the Microspot plotter driver at no extra charge. File-transfer capabilities are an integral part of Blueprint, whereas Dreams has no file translators. Claris CAD, on the other hand, has an optional file translator that translates not only PICT and DXF, but also IGES 3.0 and 4.0.

Although this is the initial release of Blueprint, many improvements have been made to the previous program, making Blueprint a good value. It will best suit those who require reasonably priced precision drawing tools—lacking in MacDraw-like packages. I can recommend it for architects and electrical and other engineers, but mechanical engineers who require drawings with diametrical dimensioning and tolerancing features will find Blueprint lacking.—*Victor Elgobary*  
 See Where to Buy or circle 726 on reader service card.

**Blueprint Management**

Layer management is accomplished through a hierarchical menu within a dialog box. This feature also lets you view the object you want to insert, before you actually place it in a drawing.





# The First Color/Gray-Scale Scanner For Under \$2200!



Microtek presents the MSF-300Z. The one scanner that can do it all: color, gray-scale, drawings and text. All for a price that until now, could barely buy you gray-scale capabilities.

Hard to believe, but it's true. You can scan vivid color images into your computer for desktop publishing, presentation graphics or pre-press work. A full 16.8 million colors at a time.

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Charts and drawings are quickly scanned in single bit-per-

pixel mode then imported into your favorite publishing or word processing program. You can even bring words into your computer without retyping by adding OCR software.

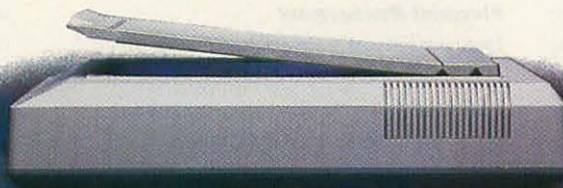
Interface kits include sophisticated color, gray-scale and black and white image editing software and are available for the Macintosh (\$500) and the IBM PC or PS/2 (\$400).

If you need a scanner for your personal computer, you need Microtek's MSF-300Z Color/Gray scanner. Call (800) 654-4160 or in California (213) 321-2121 today to find your nearest Microtek dealer. After all, at this price, you can hardly afford not to.



The MSF-300Z Color/Gray scanner is just one member of a whole family of innovative scanners available from Microtek.

Circle 427 on reader service card



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Better Images Through Innovation.



★  
FAXSTF 2.0.2

## 4800-baud Fax Modem with Software

**Pros:** Supports individual as well as group addresses; multiple phone books; background operation under MultiFinder; improved fax management and utilities; compact, portable unit. **Cons:** Maximum speed 4800 baud; no background operation under Finder. **Company:** STF Technologies. **Requires:** Mac Plus. **List price:** \$549.



The FAXstf, the first fax modem designed for the Macintosh, now has a new version of its software. While maintaining its low price of \$549, the FAXstf now includes such features as group address lists and fax cover pages.

**What's in the Hardware**

The FAXstf fax modem is a small unit (6 by 1¼ by 3½ inches) that comes with its own padded carrying case and transformer, making it ideal for carrying around with your Mac. That portability is nice, but the FAXstf is lacking other features you might expect. The fax modem does not have an on/off switch and includes only two RJ-11 sockets for a phone and the wall jack. Since the FAXstf does not have a built-in data modem, you'll either have to assign a serial port to each modem or rig up something with a T-switch if you want to use both a regular data modem and the FAXstf. Other fax modems include either a built-in data modem or an added serial port.

Unfortunately, the FAXstf's maximum transmission speed is 4800 baud. Most Group 3 faxes can handle 9600 baud. If you're a heavy fax user, you should look at the higher-speed 9600-baud fax modems, such as the AppleFax Modem, Genius's TransFax, or Orchid Technologies' MacFax.

**Getting the Fax Straight**

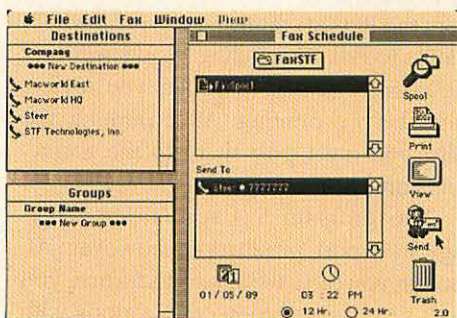
STF Technologies' upgrade of FAXstf is confined to the software. In addition to the Fax print driver for the Chooser, the software consists of the FaxManager, FaxMonitor, and FAXstf Utilities.



FAXstf from STF Technologies

Creating a fax from within an application is easy—all you do is select the Fax print driver in the Chooser and select Print from the application's menu. A dialog box appears that lets you select the name and phone number of the addressee and offers you the option of setting a later date and time for transmission. The Cover Page option allows you to choose between a full page and a half page, or no cover sheet at all. Unlike Solution International's BackFax (software to be used with AppleFax), FAXstf doesn't let you design custom cover pages; but unless you have a specific need for a special cover page, the FAXstf's cover should be just fine.

As before, the FaxManager utility is used to create phone books. FaxManager supports multiple phone books and has added group-distribution lists. For ex-

**Managing Your Faxes**

The new, improved FaxManager uses icons for the functions in the Fax Schedule window. In this case, the fax in FaxSpool is addressed to the address shown in the lower box of the Fax Schedule window; you can choose to send it immediately, reschedule it for a later transmission, print it, view it, or delete it, simply by clicking on the appropriate icon.

ample, now you can group all of your sales reps into one address group and send them all the same fax by selecting a single address.

The FaxManager also has an improved interface for rescheduling transmissions and viewing faxes (see "Managing Your Faxes"). STF Technologies has added icons for viewing and printing faxes as well as for setting a fax spool folder and sending or deleting a fax. Viewing and rearranging your faxes within the FaxManager is much easier than before. You can also convert documents to TIFF, MacPaint, or PICT format.

FaxMonitor is used for unattended sending and receiving of faxes. (You use FaxManager to start the process manually.) Unfortunately, FaxMonitor works in the background only if you're running MultiFinder. Both BackFax and Abaton's InterFax allow you to send and receive faxes in the background while running under the Finder.

Previously, the FaxMonitor checked the fax spool folder at fixed intervals to see if faxes needed to be transmitted; version 2.0.2 lets you specify the intervals most convenient for you.

Version 2.0.2 has added FAXstf Utilities, which provides additional management functions not available in the FaxManager program. For example, you can convert a text file to a FAXstf phone book and vice versa; you can combine fax files, delete fax pages, and convert either PICT or MacPaint files to fax files. All this is nice, but ideally, these functions should have been integrated into the FaxManager.

**The Second Try—Better, but Not the Best**

Version 2.0.2 does a good job of addressing some of the problems in FAXstf's first release, particularly problems with group addresses and managing faxes. However, lacking a data modem and being limited to 4800 baud or less, the FAXstf is still a less attractive buy than the 4800-baud Abaton InterFax, for example, which includes a 1200-baud data modem and lists for \$495. With its small size, the FAXstf has the edge in portability, but it still is not my first choice.—Dave Kosiur

See Where to Buy or circle 746 on reader service card.



## TIMESLIPS III 1.1K

### Time- and Expense-Billing Software

**Pros:** Time and expenses easily recorded; allows wide range of billing options; good manual.

**Cons:** Awkward user interface; no import facility; needs better report layout capabilities.

**Company:** North Edge Software. **Requires:** Mac Plus; second disk drive. **List price:** \$299.95.



People who bill by the hour often find themselves trying to consolidate many different pieces of paper into a comprehensive bill at the end of the month. In the process it's easy to neglect to record some charges.

Timeslips III, the Mac version of a popular billing package for MS-DOS computers, consists of a desk accessory called TSTimer for time slips and the TSReports application for producing bills and reports. You assign each time slip a resource or user being billed, an activity or project (such as consulting), and a client. You also assign a billing rate to any one of three categories: resources (users), projects, and clients. Timeslips handles up to 250 users and 2000 clients, with as many as 128 activities, or matters, per client. You can also combine different users' files into a master file for billing.

#### Clocking In

When a client calls, you start the TSTimer DA from the Apple menu, choose New Timeslip, and, if needed, click the Activity and Client buttons to choose who and what will be billed. Selecting the Turn on button makes the time slip active, starts the clock, and activates the money display. You can shrink the TSTimer screen size by clicking the Mini View button and move the timer to a little-used area of your screen and it keeps running. The timer also works in the background under MultiFinder, even with the view closed. A time slip can span a number of days, being turned on and off as needed. You can mark a slip Unbillable or No Charge and later print a report of unbillable time. If a client wants to review current charges, you can use the Find facility to search and

select time slips by user-specified criteria. You can also create expense slips, which are gathered into a separate section on the final bill.

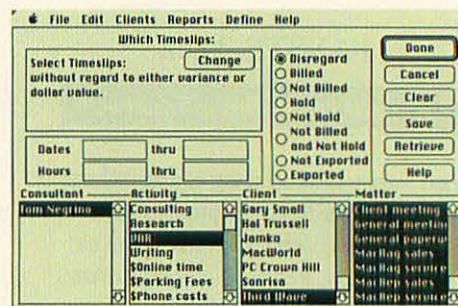
#### Mixed Reports

TSReport collates time slips and prints bills and reports. Client information is entered on five consecutive screens: General Information, for the client name and address; Billing Options, for the tax rate, aging and interest rate for overdue bills, and flat fee amounts; Bill Adjustments, for markups or markdowns or to round to the nearest user-specified interval; Billing Format, for customizing the appearance of a client's bill; and Billing Status, for client funds on hand, aged balances, and last payment information. A Transactions menu lets you add expenses, payments, finance charges, and credits; and the History screen shows you the year's monthly total bills and payments with cumulative time and dollar figures.

Timeslips III offers an exhaustive array of reports. You can list the clients who produce the most billable time; the activities that produce the largest billings; and actual time versus estimated time spent with each client. You can also generate pie and bar graphs. Client reports give you lists of activities, transactions, and history; aged accounts receivable; and mailing and file-folder labels.

Timeslips III lets you see your bills before printing. After you choose Bills from the Reports menus, you select which clients to bill. The Billing Worksheet lists the charges selected and lets you review them before printing. After printing the bills, you must post them to the receivables and history sections.

The program has several shortcomings in report production, however. Although you can save a report's format, you can't save the selection criteria along with the report, so you have to reenter them each time. North Edge suggests you use a macro program such as QuicKeys or Tempo II to automate this process, but it would be better if the report format incorporated the criteria. There is no provision for adding extra note fields on a report, such as payable upon receipt. In order to use graphic elements such as logos and rules



#### Picking Slips

You can isolate one client's time slips for individual billing. By clicking the Change button (which brings up a dialog box with dollar values) or using the date and hour fields, you can select particular time slips for a client or for all clients.

you must first create the elements in a graphics program, copy them to the Clipboard, then use Timeslips' Backdrop option to grab the Clipboard and save it as part of a report format. The imported image cannot be edited or moved; to make any change in the report format, you must return to the graphics program and repeat the process. The text portions of reports are automatically placed in the report layout, but there is no way to change the position of the text, although you can assign font attributes. North Edge Software has indicated that a desperately needed layout editor for moving and arranging text and graphics is under development.

Another disadvantage is TSReport's inability to import information. For example, if you are using another billing program, you will have to retype all of your client data. North Edge's MS-DOS program, TIM, will convert spreadsheet, text, and Mac Timeslips III files to PC Timeslips III format, but a company spokesman says there are no plans to produce a comparable product for the Mac.

Aside from the report and import shortcomings, Timeslips III is a full-featured time- and expense-billing program that should satisfy the needs of the most demanding professional. After using Timeslips III for a while, you'll probably discover that you're more accurately recording and billing your time. If you bill by the hour and work with a Mac, the program is well worth considering.

—Tom Negrino

See Where to Buy or circle 853 on reader service card.



Can anybody even come close to matching the colors you get with a Tektronix ColorQuick™ Ink-jet Printer? The performance? How about its value? Or ease of use?

More importantly, can anyone in your company match the way your presentations and graphics will look once you acquire one for yourself?

Not likely.

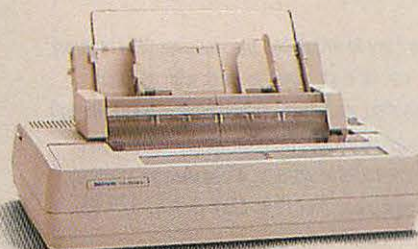
The ColorQuick Ink-jet Printer is the first color printer designed specifically to work with the Mac. Printing at 216-dpi, it recreates an exact multiple of the 72-dpi Mac screen resolution so there's no image distortion. And the

ColorQuick Ink-jet Printer includes the highly praised, proprietary TekColor™ calibration software from the brilliant minds at Tek Labs. Which, quite simply, ensures that the color you see on screen is the color you print.

The ColorQuick Ink-jet Printer works with transparencies or paper, up to tabloid size. It comes with 11 standard typeface families that produce crisp, full resolution characters. There's even a PostScript-compatible ColorQuick.

And the ColorQuick Ink-jet Printer works with Apple's 32-bit QuickDraw to enhance color by breaking the 256 color barrier.

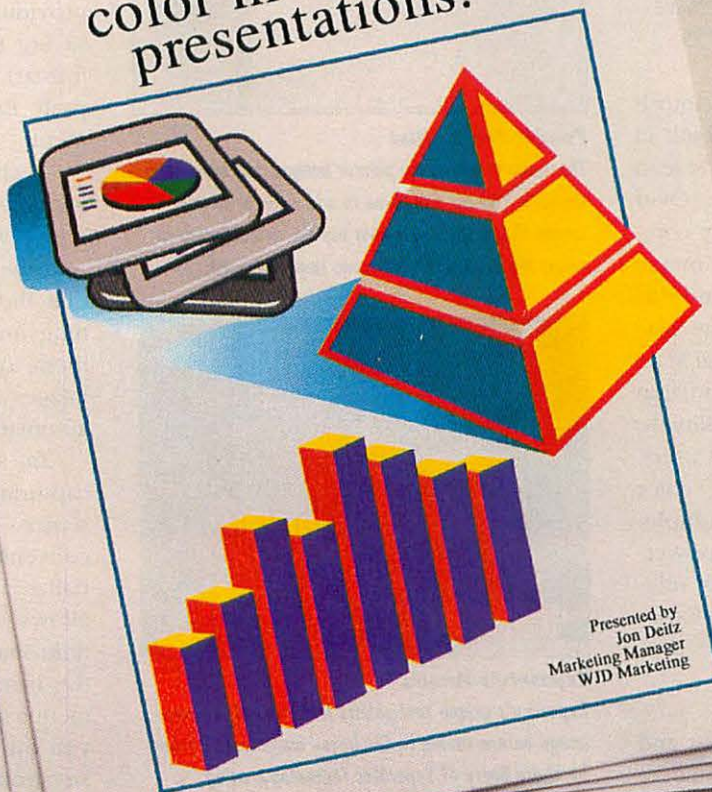
Now you've met your match. See your Tektronix dealer for a demonstration and a sample color printout. For more information call 1-800-835-6100 Dept. 5C, or fax your message to (503) 682-2980.



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The effects of  
color in business  
presentations.



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## Screen-Capture Utilities

### CAPTURE 2.0

**Pros:** Easy to install and use; requires little memory; can be customized to work with any key combination, including function keys. **Cons:** Doesn't capture images from secondary screens on multiple-monitor systems. **Company:** Mainstay. **Requires:** Mac Plus. **List price:** \$79.95.

### EXPOSURE 1.0

**Pros:** Offers almost unlimited flexibility in format and destination of captured image; provides powerful paint tools for editing captured images; can be customized to work with almost any key combination, including function keys. **Cons:** Complex interface takes time to learn; requires more disk space and memory than the other two. **Company:** Preferred Publishers. **Requires:** Mac Plus. **List price:** \$99.95.

### SNAPJOT 2.0

**Pros:** Captures multiple images in windows; can be used for desktop note keeping; inexpensive. **Cons:** Doesn't save images automatically; not compatible with function keys. **Company:** Wildflower Software. **Requires:** Mac 512K. **List price:** \$49.95.

The designers of the Macintosh operating system wisely built in an easy way to capture screen images as MacPaint files. Over the years the ⌘-Shift-3 key combination has ably served anyone who needed to capture and display exactly what's on the Mac screen. But like the original MacPaint, this built-in screen-capture function key lacks the power and versatility to serve the needs of many of today's users. Pull-down menus, dialog boxes, color graphics, large screens, and multiple-monitor displays demand a more powerful snapshot tool. Three third-party utilities, Capture 2.0, SnapJot 2.0, and Exposure 1.0, are designed to fill this need.

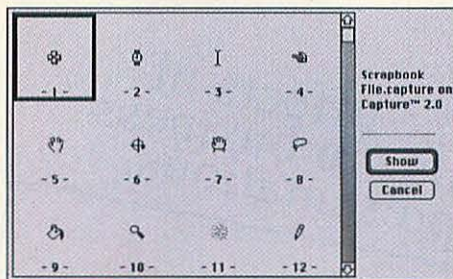
#### Capture

Of the three, Capture is the simplest and most intuitive. To install Capture, you drag it into the System Folder and restart the

machine. Once you've done that, ⌘-Shift-3 invokes Capture rather than the original Mac screen-capture utility.

Instead of simply creating a MacPaint image of the entire screen, Capture turns the pointer into a crosshair and waits for you to select a portion of the screen. The selected section (even if it includes a dialog box or a pull-down menu) is transferred directly to the Clipboard for pasting into the document of your choice. If you hold down the Option key while you mark your selection, the image is saved as a PICT file that can be edited with MacPaint, MacDraw, or any other program that can handle PICT files. (In programs like MacDraw, PICT images can be resized without the distortion that often occurs with bitmapped MacPaint images.) Grayscale and color images are saved in PICT2 format.

Since Capture is a CDEV (Control Panel device), you can modify it via the



#### Pointer Possibilities

These are a few of the pointer images that come with Capture. You can use these to add a cursor to your screen shots, since you must use the actual cursor to select the portion of the screen that you want.



#### Exposure's Palette

Exposure's unique tool palette lets you edit a screen image before saving it. The house image was created by Claire Barry of SuperMac Technology, using PixelPaint Professional.

standard Mac Control Panel. Capture lets you reverse the default so that images are automatically saved, rather than placed on the Clipboard, and it lets you change the keystroke combination that invokes Capture. If you're using Apple's extended keyboard, you can assign Capture to a function key so that a single keystroke invokes it.

#### SnapJot

SnapJot consists of a desk accessory and an INIT; installation involves dragging the INIT into the System Folder, installing the DA with Font/DA Mover, and restarting. Once installed, SnapJot can be invoked either with the SnapJot DA or the ⌘-Shift-S key combination (a menu option allows you to designate any other letter or number, but SnapJot cannot be assigned to a function key).

Either way, the pointer changes to an arrow in a box waiting for you to select a portion of the screen. (SnapJot works without restriction on multiple-monitor systems.) After you drag, a distinctive SnapJot window materializes containing an exact copy of the selected screen segment and a SnapJot menu appears, providing you with options for printing or saving the image (in PICT or MacPaint format). You can, of course, also copy and paste the window contents via the Edit menu.

Each time you invoke SnapJot, a new window joins the others on the screen. These windows can be moved around. And they remain on the screen until you quit the application or, if you are running under MultiFinder, until you close them, quit SnapJot, or shut down. The images in these windows are not saved automatically.

In some situations—when you're capturing a menu or dialog box for instance—it's either impossible or else inconvenient to have a new window materialize on top of everything else. SnapJot allows you to hide an image until the next time SnapJot is invoked. This *queuing*, as the manual terms it, is automatic when menus and dialog boxes are present, and you can invoke it with a combination of keystrokes and mouse movements when (continues)



# MacAcademy Pioneers Macintosh Video Training Breakthrough

DAYTONA BEACH, FL- "There's got to be a faster, easier, and less expensive way!" This statement sums up the frustration that Randy Smith felt three years ago as he tried to find training for the Macintosh computer.

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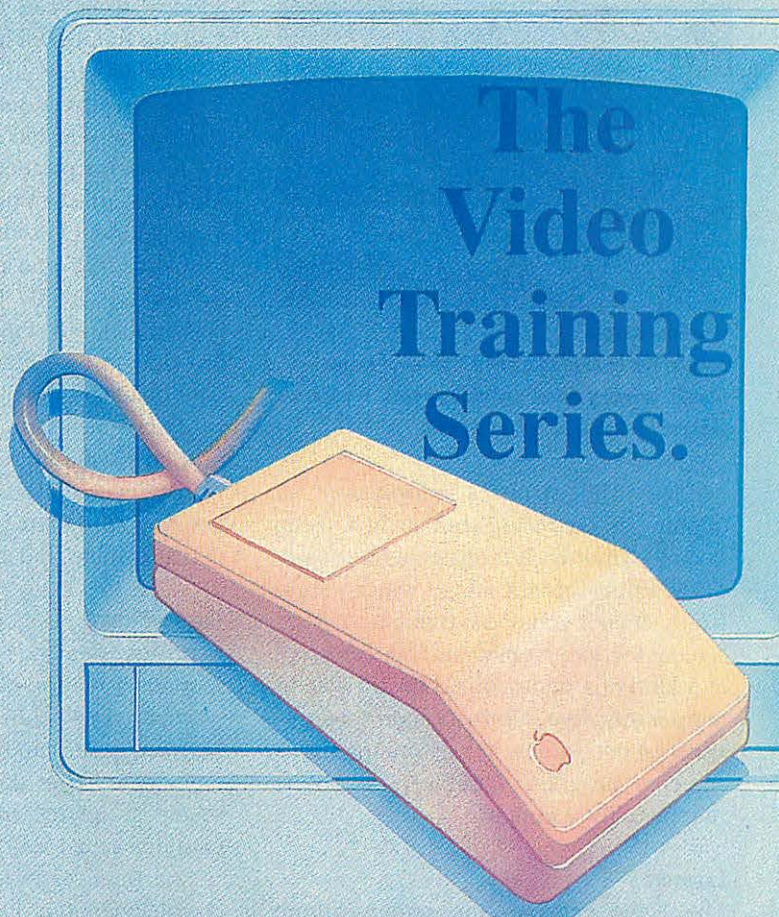
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#### Window Snaps

**SnapJot** can be used to capture a series of screen images, including menus and dialog boxes, in windows that can be copied, saved, or printed.

needed. The manual's information on queuing is confusing, but in fact using queued windows is fairly straightforward.

SnapJot's instant image windows are handy even if you aren't trying to capture screens for documentation. They can serve as a kind of a photocopied Post-it note to temporarily save information on screen—spreadsheet values, telecommunications screens, program variables, or phone numbers, for example.

#### Exposure

The latest entry in the screen-capture feature race is Exposure, an incredibly versatile utility that far outdistances the competition. Like Capture, Exposure is a CDEV that allows you to use the Control Panel to choose a magic key combination. But when you invoke Exposure by typing that combination, you freeze the screen and bring forth a small window, complete with menu bar and tool palette.

Exposure's tools and menu commands provide a complete graphics environment for editing the screen before you capture it. Most of the familiar MacPaint/HyperCard tools and effects are available, but many of these tools have advanced features not found in their MacPaint counterparts. For example, the familiar eraser has been enhanced; you can choose from a set of erasers ranging in size from 1-by-1 to 16-by-16 pixels.

The tool palette also includes tools designed for editing captured screens. The window tool lets you easily capture a window or windows without any of the surrounding background. The tear-off tool lets you add a ragged edge to a menu or

window to indicate that it's not all there. And the frame tool lets you surround the selected image with a custom frame.

Once you've edited, labeled, and framed the selected screen image so that it's ready for printing, you save it to the Clipboard, the Scrapbook, or to a disk file in any one of a dozen paint or PICT formats. Or, if you prefer, you can print the image directly from Exposure. The possibilities are staggering—and, for the first-time user who's working against a tight deadline, potentially overwhelming.

Exposure is virtually impossible to use properly without reading the clear but wordy manual. As with any full-featured graphics program, mastering Exposure demands time and patience.

#### The Big Picture

Exposure demands more than time; it requires a whopping 299K of disk space (compared with 22K for SnapJot and only 9K for Capture) and in some cases, more memory. Of the three utilities, Capture seems to be the most reliable in low-memory situations.

All three of these utilities share two classic limitations. First, none of them will scroll to allow you to capture images larger than the visible screen. Second, you can't capture a screen without changing it. Most importantly, you can't capture the pointer since you're using the pointer to select the portion of the screen to be captured. (To partially remedy this problem, Capture includes a scrapbook full of common pointer images that can be pasted into your captured screens. Exposure provides a better solution: a tool that lets you stamp your favorite pointer image right onto the soon-to-be-captured screen.)

Any of these utilities will pay for itself quickly if you frequently work with screen images. Capture is a simple low-overhead tool with clear documentation and attention to detail. SnapJot demands a little more of the user, but offers some interesting extras in return (at less than Capture's cost). Exposure is the hands-down winner, though, for professionals with the time and the equipment to put it to good use.—George Beekman

**See Where to Buy or circle 727 (Capture), 742 (Exposure), 828 (SnapJot) on reader service card.**



## ACCUTEXT 1.0

### Optical Character Recognition Software

**Pros:** Provides excellent control for poor-quality documents; imports and saves several TIFF formats; provides user-customizable dictionary for better accuracy.

**Cons:** Lacks text-view window for editing immediately after recognition; needs at least 5MB RAM under MultiFinder; can only read 8- to 24-point type. **Company:** Xerox Imaging Systems.

**Requires:** Mac with 68020 or 68030 processor; 4MB RAM; hard disk; scanner; System 6.0 and Finder 6.1 or later versions. **List price:** \$995.

## OMNIPAGE 2.0

### Optical Character Recognition Software

**Pros:** Has built-in ability to distinguish text from graphics; recognizes text in several foreign languages; recognizes 8- to 72-point type. **Cons:** Provides limited control over scanning, fonts, and layouts it doesn't understand; has limited TIFF import capabilities. **Company:** Caere Corporation.

**Requires:** Mac SE/30 or Mac II; 4MB RAM; hard disk; scanner. **List price:** \$795.



Last year users everywhere breathed a sigh of relief when Caere Corporation introduced OmniPage, the first automatic optical character recognition (OCR) program for the Mac. Now OmniPage faces a stiff challenge from AccuText, an automatic OCR program from Xerox Imaging Systems, the company formed when Kurzweil (long known for its OCR expertise) and Datacopy merged last year.

Both OmniPage and AccuText can recognize all kinds of fonts, in all styles, and in a range of point sizes. No training is necessary for either program. This ease-of-use has its tradeoffs, however, in hardware requirements. First, you'll need at least a 68020 CPU to run the programs. Second, you'll need lots of memory—and the more, the better. Under MultiFinder, OmniPage needs at least 3MB of RAM, AccuText a whopping 4MB.

To recognize text, OmniPage and (continues)





*Ruby Callany*  
import/export

*Joe Kevin Nash*  
writer

*Martin Waterhouse*  
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AccuText use a technique called feature extraction, which identifies scanned characters based on their attributes (curves, lines, and so forth). AccuText goes one step further, using artificial intelligence (AI) routines to recognize not just individual characters but whole words. In addition, AccuText optimizes recognition with a built-in 50,000-word dictionary and context rules.

An OCR program should provide direct access to your scanner so that you can scan images directly into the program for recognition. OmniPage supports scanners from Apple, Abaton, and Dest, in addition to the Agfa Focus, the Hewlett-Packard ScanJet, and the Microtek A, C, G, and Q series. AccuText, meanwhile, offers built-in drivers for the Apple Scanner; Microtek MS 300A; HP ScanJet; and Datacopy 730, 730GS, 830, and JetReader.

Should your scanner not be one of the above, both OmniPage and AccuText allow you to recognize and open TIFF image files. Unfortunately, not all TIFF files are created equal. There's uncompressed TIFF, compressed TIFF, TIFF Packbits, and so on. While I had no trouble opening a variety of TIFF-format images with AccuText, OmniPage 2.0 supports only uncompressed TIFF. Nor will OmniPage open TIFF CCITT 3 files, which is the format many fax modems use for saving images. According to Caere, however, version 2.1 will recognize scanned images in compressed TIFF format.

### Getting Better

Caere has made some aesthetic changes and feature additions to version 2.0 of OmniPage. Streamlined menus make the program easier to use and understand. Online help is available (a good thing, because even the program's completely rewritten documentation is still too skimpy for my taste). Landscape-orientation scans and recognition are supported. The most impressive enhancement is OmniPage's support of eleven languages, ranging from Gaelic to Norwegian. Although you can create personalized command sets in OmniPage, settings from old versions of OmniPage are not compatible with OmniPage 2.0.

OmniPage recognizes text on a scanned page in several steps. First, it searches for text, automatically stripping out any graphics. Then the program outlines any blocks of text it finds, and it analyzes characters in those outlined blocks. Should there be problems with the text block outlining, there's nothing you can do short of attempting a rescan. Nor is there any way to tweak accuracy rates within OmniPage if it finds your page difficult to read.

You can watch the recognition process via an on-screen character window that provides a close-up view of the scanned image. Final text appears in what Caere calls the Transitional Editor. This editor offers limited capabilities (search and replace, find, cut, copy, paste) and is most useful for text saved in ASCII format. OmniPage can also save in MacWrite,

Microsoft Word, Microsoft RTF, WordPerfect, or Excel text formats. If you save a file in any of those formats and then edit it in the Transitional Editor, however, you'll lose all the formatting codes.

### Fine Control

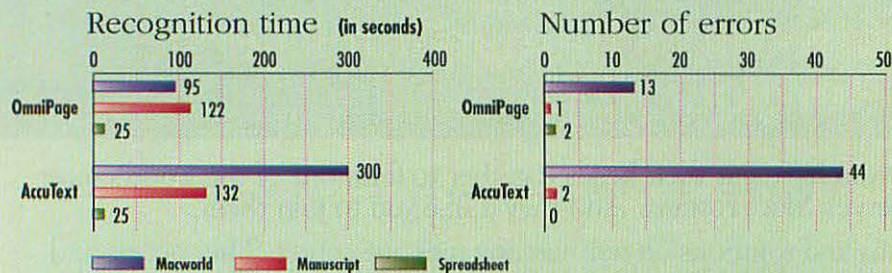
AccuText has two types of menus: Short Menu, intended to minimize setup time, and Extended Menu, which feature a host of options for controlling the scanning and recognition process. In Short Menu, you can control brightness and contrast settings for scans; in Extended Menu, you can set everything from choosing the number of columns on a page to specifying the type of text to be recognized (alphanumeric, numbers only, or letters only). Text can also be saved in Microsoft RTF, Microsoft Excel, MacWrite, or ASCII format.

Like OmniPage, AccuText follows a sequence of steps to recognize text. In a deviation from typical Mac interface design, you first name and save a file for output. The program then loads the language lexicon. English is currently the only available language, although Xerox Imaging Systems does say others are in development. AccuText then examines the page to distinguish between text and graphics. Unlike OmniPage, AccuText does not automatically discard graphics. This characteristic causes problems if the graphics contain some text, such as an advertisement or logo; the program can stubbornly try to recognize the text, slowing down performance. You can use AccuText's excellent Preview mode to tell the program to ignore such graphics during scans, but you will have to do that for each page. And although AccuText supports both portrait- and landscape-orientation scans, you cannot preview any landscape documents.

When AccuText recognizes characters, it correlates new images with information collected from earlier images in the scan. At the same time, it tries to ensure that groups of recognized characters form reasonable words. To increase the hit rate, AccuText lets you create your own dictionaries—ASCII files—of specialized words not normally found in a stan-

(continues)

## OMNIPAGE VERSUS ACCU'TEXT



Tests were performed on three complex *Macworld* pages, a one-page manuscript, and two pages from a complicated spreadsheet. Overall, OmniPage proved faster and more accurate on the complex pages, while recognition time and accuracy were about even on the manuscript and spreadsheet.





Parts Schedule  
Materials List  
Cost Estimates  
Door Schedule

	A	B	C
1	Desk Area	Plotter	102 Sq In
2		Mid Sect	
3		Computer	175 Sq In
4			
5	Room	Office	246 Sq Ft
6		Foyer	200 Sq Ft
		WC	150 Sq Ft

Send list to the  
file "Materials?"

Yes

No

## Parts Schedule

## Cost Estimates

## Materials List

Qty	Description	
	Surface Materials	23.45
36	5/8" Wall Board 5' X 10'	14.50
142	1/8" Tile - Mosaic	56.95
2689	Brick - Chicago	12.00
63	Siding Alum (Sky Bl)	78.95
12	Paneling (Oak)	12.00
		05.00
		67.45
	Wall Fixtures- Elec:	34.00
24	Wall Outlets	78.00
18	Single-Pole Switches	62.00
	Modular Phone Jacks	\$5.00
	CTV Plug-In	34.00
	Thermostats	67.89
		45.00
	Lighting Fixtures:	12.00
	Faucets	
	Power Enclosure	
	Dray	

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## Nobell Chem Revenue Potential Product Portfolio Breakout

	1989	1990	1991	1992
<b>High Growth Markets</b>				
Medical Applications	15	25	40	60
Industrial Applications	30	39	46	51
<b>Total</b>	<b>45</b>	<b>64</b>	<b>86</b>	<b>111</b>
% of total	55%	63%	68%	72%
<b>Mature Markets</b>				
Defense Applications	36	38	40	42
% of total	45%	37%	32%	28%
<b>Total Revenue</b>	<b>81</b>	<b>102</b>	<b>126</b>	<b>153</b>



N o b e l l C h e m

Report to the Board of Trustees

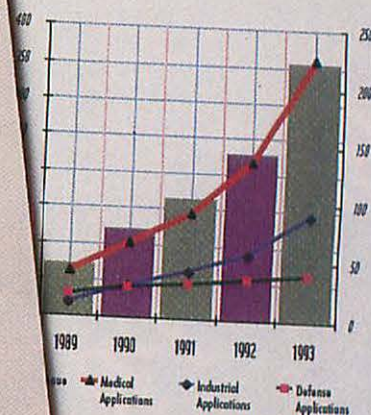
During the past twelve months, the Nobell Chem Corporation pulled far ahead of the competition, through the diverse and strategic marketing of its Nitro Glycerin compound.

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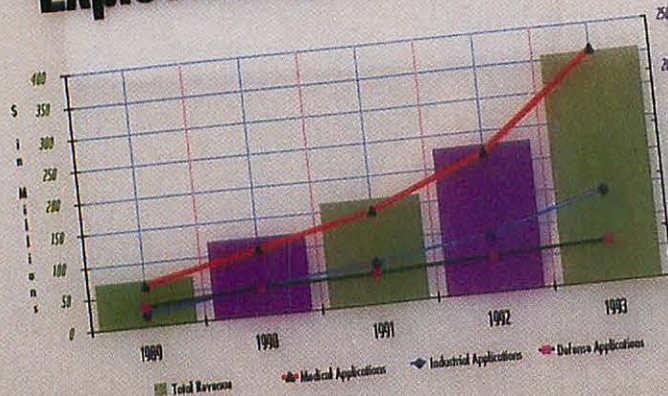
1989	1990	1991	1992	1993
15	25	40	60	85
30	39	46	51	72
36	38	40	42	44
<b>81</b>	<b>102</b>	<b>126</b>	<b>153</b>	<b>201</b>

## Explosive Growth Potential



N o b e l l C h e m

## Explosive Growth Potential





# Advantage to combining men again, some thought at nitro and glycerin.

If you own a Mac® you may already know what a phenomenally powerful piece of software Microsoft® Word is.

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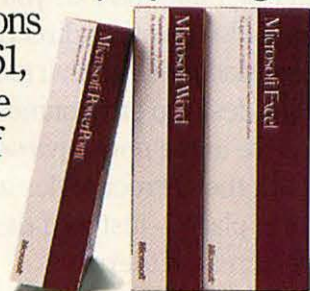
This is where warm links saves the day (or the hour). No more antiquated manual moves of opening and closing your document, cutting, pasting and praying. With warm links, you simply open your Word document and select Update Link. Word automatically finds the latest Excel data and updates

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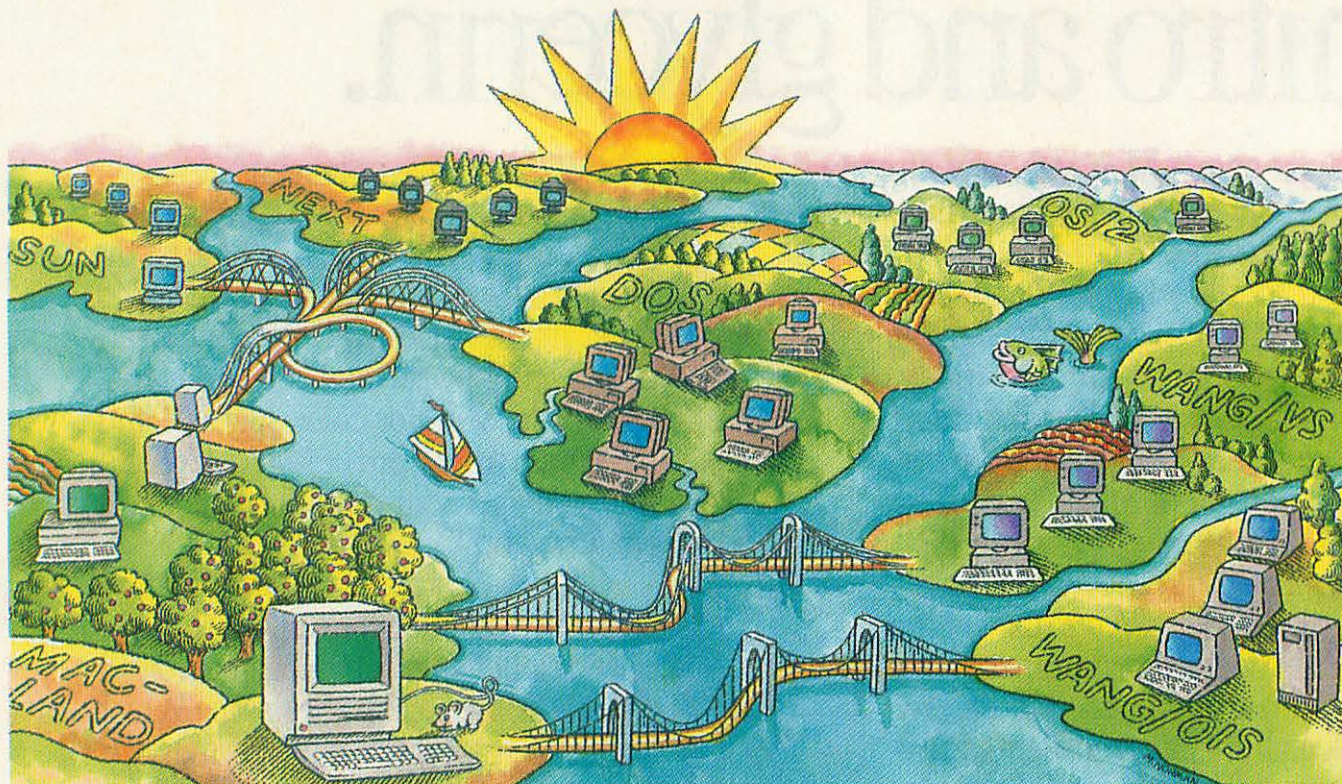
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Can't Undo	⌘Z
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
Again	⌘R
Table...	
Glossary...	⌘K
Show ¶	⌘Y
Paste Link	⌘F4
Update Link	⌘F3

After you update your data in Microsoft Excel, select "update link" from Word's edit menu, and the change will automatically appear elsewhere.



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dard dictionary. You can watch the program's progress by turning recognition feedback on. Unfortunately, that's all the feedback you get within AccuText. The program doesn't have a built-in editor to view recognized text.

AccuText lets you create and save specialized settings, an especially handy feature if you process similar types of pages. These settings include all information except user-defined lexicons. There's a nice touch for users needing to recognize double-sided pages, especially with automatic document feeders: You can scan all the odd-numbered pages first, turn the stack over, and scan the even-numbered pages in reverse. AccuText automatically collates pages in correct sequence in the output file.

#### Put to the Test

I put OmniPage and AccuText through their paces by trying to recognize pages from three different documents: a spreadsheet, a 2-page manuscript, and 3 complete pages from *Macworld* (see "OmniPage versus AccuText").

Overall, I was impressed with OmniPage's speed and accuracy on the *Macworld* pages. As far as the spreadsheet and manuscript were concerned, I'd call it a draw. The numbers of errors were about equal, as were recognition times.

AccuText took much longer to recognize the complex *Macworld* pages than OmniPage. AccuText also made significantly more errors. Most of these were consistent substitutions, such as > for ), the letter l for the number 1, and O for 0. OmniPage did a much better job at recognizing *Macworld's* large, boldfaced type. On the other hand, OmniPage did make some formatting errors, such as thinking some text was italicized when it wasn't.

If your pages are very complex, OmniPage is probably your best bet. I like the way AccuText lets you control scanning and recognition, but plan on spending a lot of time fiddling with options for, and previewing, complex pages. If you're looking for adaptability, TIFF-import, and solid image-scanning capabilities, as well as OCR, pick AccuText.—*Brita Meng*  
**See Where to Buy or circle 723 (AccuText), 800 (OmniPage) on reader service card.**



## KIDSMATH 1.1

### Math Education Game for Children

**Pros:** Excellent sound and graphics; variety of games maintains interest. **Cons:** Limited customization possibilities; some games are difficult for preschoolers to play alone; doesn't take advantage of large screen or color. **Company:** Great Wave Software. **Requires:** Mac 512K. **List price:** \$49.95.

## MATH RABBIT 1.0

### Math Education Game for Children

**Pros:** Easy for young kids to understand and use; excellent sound and graphics; customizable for different developmental levels; money-back guarantee. **Cons:** Useful for drill but not for teaching; doesn't take advantage of large screen or color. **Company:** The Learning Company. **Requires:** Mac Plus. **List price:** \$59.95.



For years educators have complained that the Macintosh lacks the educational software base of the aging Apple II. Although holes in the curriculum still remain to be filled, there's really no shortage of programs for teaching and reinforcing arithmetic skills to young children.

Two recent releases, Great Wave Software's KidsMath and The Learning Company's Math Rabbit, join an already crowded field to compete for the right to help teach your children.

Each is a collection of games designed to build basic math skills. KidsMath is aimed at the three-to-eight-year-old learner; Math Rabbit targets four-to-seven-year-olds. Each uses animation and sound to entertain children while they practice math skills. And each, in its own way, succeeds as a tool for making math more fun for the very young.

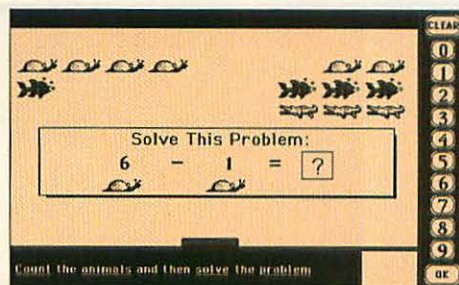
It's more interesting, though, to look at the differences between these two programs. Developers of early childhood software face three major challenges: communication, motivation, and education. Math Rabbit and KidsMath deal with those challenges in very different ways.

#### Communication

The first problem preschool software developers face is the problem of communication. How can you expect a child to read a screenful of instructions when she may not be able to read her own name? Both programs use picture menus to get around the problem of reading menus. Even the youngest kids quickly learn how to click on pictures to play their favorite games.

But picture menus don't give instructions, so the programs must use other tools to deal with those. Math Rabbit shows an animated picture of a mouse being clicked whenever a click-to-continue message is appropriate. The instructions for each Math Rabbit game are hidden under a Help menu, but the games are simple enough that most kids won't ever need to ask an adult to read them. Even a child who has trouble reading numbers will probably do just fine with these games, since the number problems are clearly spoken aloud ("twenty-nine minus five") by a digitized voice that sounds suspiciously like the recorded lady in the phone who told me what time it was when I was growing up.

KidsMath has no spoken voices, but it uses a clever trick to make the printed instructions on the screen more accessible to early readers. Key words are underlined; kids can click on those words, HyperCard style, to see visual definitions or demonstrations of the concepts represented by those words (see "Animal Subtraction"). My team of young software testers found these visual clues interesting, but not particularly enlightening. Those (continues)



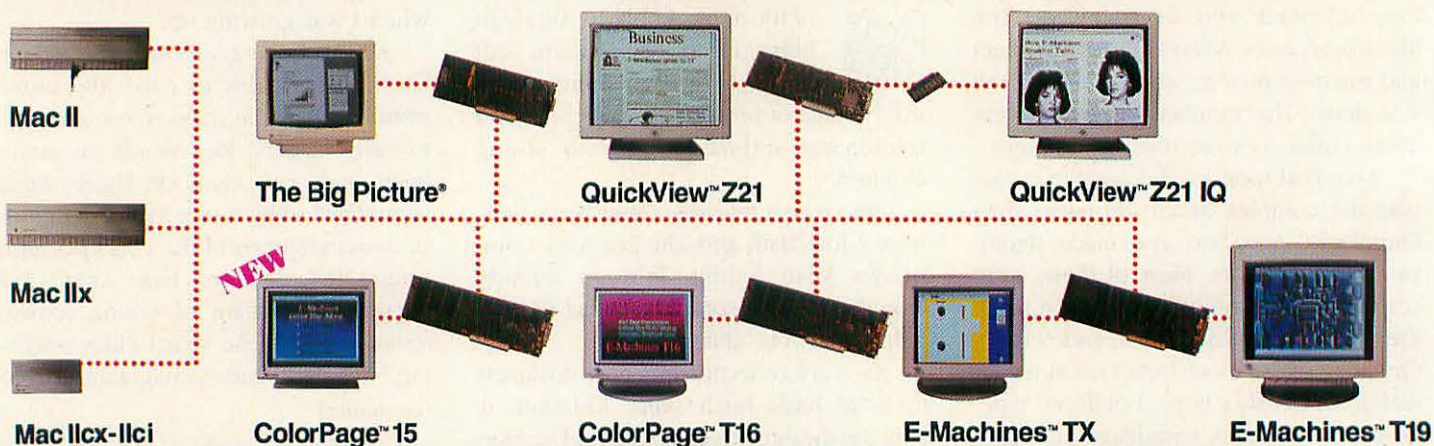
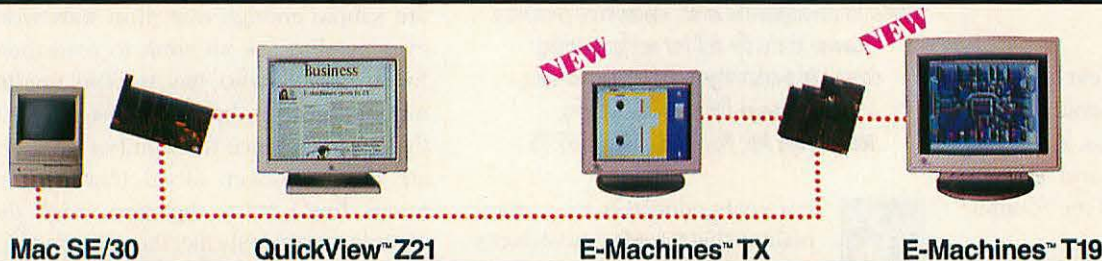
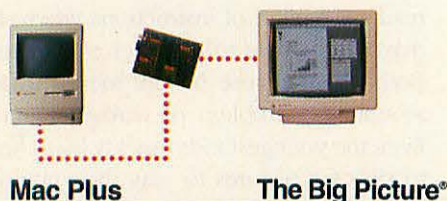
#### Animal Subtraction

In KidsMath key words are underlined so that kids can click on them to see visual definitions or demonstrations of what the words represent.



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kids who couldn't understand the instructions generally had to ask an adult or older kid for help the first time through, hints notwithstanding.

### Motivation

Educational software is of little value if you can't get the child to use it. Both of these packages provide motivation aplenty by making a game of the learning process. In each of the Math Rabbit games, an animated rabbit is presented with a number of challenges; it's up to the child behind the mouse to help the rabbit with those challenges. If the child succeeds, the rabbit dances (see "Riding the Rails"). Just the ticket to keep a typical five-year-old happy (for a while).

KidsMath has eight distinct games. My testers gave them high marks in the fun category. Different kids chose different games as their favorites. Older kids were especially attracted to Paddle Ball and Shuffle Board, both of which have an arcade feel. My youngest tester felt most comfortable with the two simplest games, Mouse Practice and Counting.

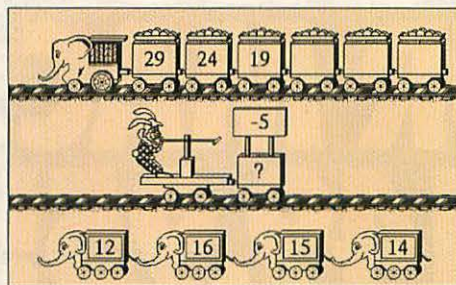
All of the KidsMath games provide the same reward for doing well: a couple of seconds of a digitized rock and roll riff (and no dancing rabbit). My testers gave the music a high score. Some even danced.

### Education

Learning arithmetic skills involves practice. And each of these programs provides an entertaining way of doing so.

Math Rabbit seems especially well suited for younger learners who need practice. It provides no tutorials, but it clearly helps build counting and simple addition and subtraction skills. The type and difficulty of the problems can be customized to meet changing needs up through first grade. My youngest tester showed a clear preference for Math Rabbit, in part because it could be customized to her exact developmental level.

KidsMath has more ambitious goals, with games designed to teach everything from mouse control to fractions. In many of these games, the program goes beyond simple drill and provides animated coaching when the child misses a problem. But in spite of its stated age range of three



### Riding the Rails

*In Math Rabbit's Circus Train game, a correct answer adds one more car to the train. When the train is full, it pulls out of the station and the rabbit does a jig.*

through eight, my testers agree that it's most appropriate for kids in the upper half of that range. My youngest tester found most of these games too hard; my oldest testers loved those hard games, in spite of the fact that they were officially too old to learn anything from them.

### Click on Your Favorite

My software testing crew approves of both of these programs, and I do too. Math Rabbit is a particularly friendly program for preschoolers, and KidsMath is a great choice for young grade schoolers.

—George Beekman (with Ben, Johanna, Andy, Anna Marie, Bethany, Chelsea, Jesse, Caley, Lucy, Jeannie, and Sue)

**See Where to Buy or circle 776 (KidsMath), 786 (Math Rabbit) on reader service card.**

## SHADOW 1.23

### Backup Utility Desk Accessory

**Pros:** Backs up files on the disk transparently.

**Cons:** Not completely compatible with all software.

**Company:** Natural Intelligence.

**Requires:** Mac 512KE. **List price:** \$49.95.



Invariably, it seems, the days my Mac crashes are my most productive. Despite their obvious utility—if I'd had one, I wouldn't have lost anything—autosaving features are built into relatively few pieces of software. Natural Intelligence's Shadow offers automatic backup for most applications.

Shadow is a sophisticated desk accessory that runs in the background with

either the Finder or MultiFinder. Although there are already a number of public domain desk accessories that will save the current document every few minutes, Shadow can do this and also maintain a second backup copy of a document anywhere in your file system. This means, for instance, that your main backup copy could be kept on the hard disk while Shadow maintains a current backup on a floppy disk. Backing up on any combination of storage devices hooked to your system is possible. And you can set the amount of time Shadow waits between either autosaving or making backups in units as small as one minute.

### Autosaving

Shadow maintains a list of documents you want backed up and watches for changes to them. At the time interval you've chosen, it checks to see if you've updated any of the files on that list. If you have, it will update its backup copy. When you open a new document, Shadow asks if you want to add it to the list (just in case you forget). The current list can only have 99 entries, but you can make as many lists as you wish and switch between them whenever you need to.

Unfortunately, Shadow cannot autosave in applications that use nonstandard ways of handling command keys. Microsoft, for instance, is not known for following the standard Macintosh guidelines—so I wasn't surprised to discover that Shadow's autosaving feature wouldn't work with Word 4.0 and Excel 2.2. The Shadow manual, however, describes a way to fix the problem by switching some of the command keys. The technical-support team at Natural Intelligence is working on a fix for autosaving with Excel 2.2 as well.

### Not Foolproof

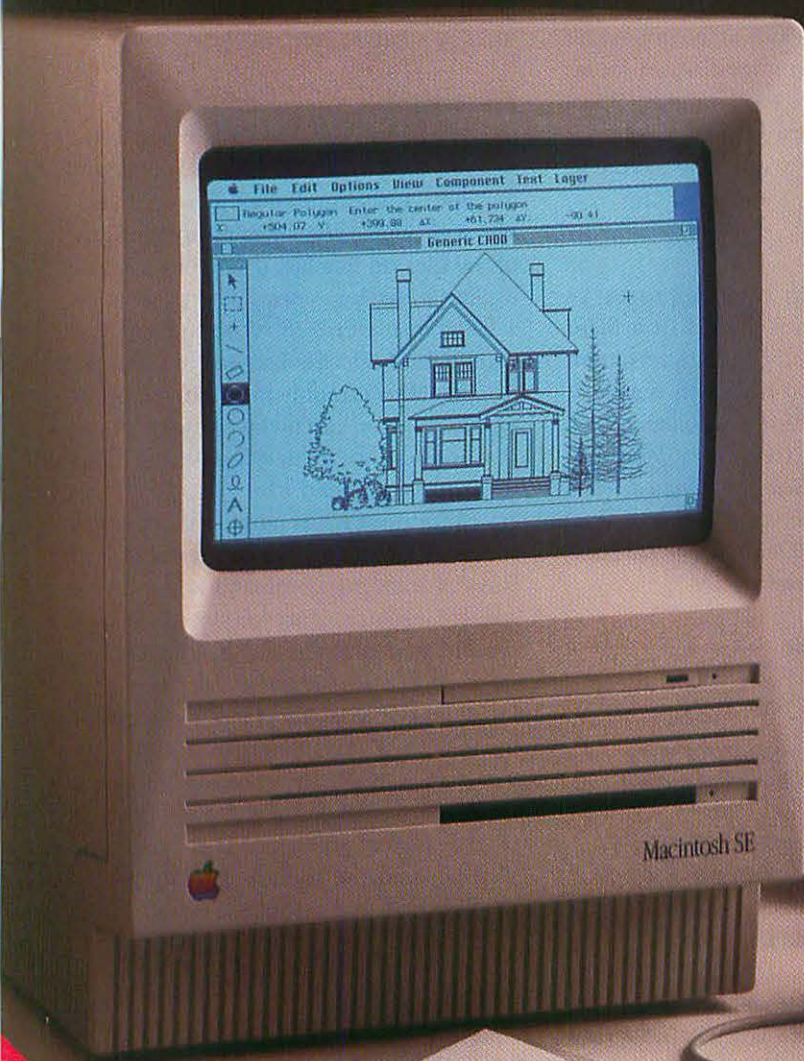
Unfortunately, Shadow is not foolproof. When it works, it works well. Shadow fails when it can't figure out how to interface correctly with an application. But until every developer includes autosaving and automatic backup as a standard feature, Shadow fills an important backup need.

—Peter Wayner

**See Where to Buy or circle 823 on reader service card.**



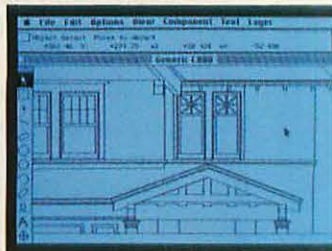
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S O F T W A R E



## STAR WARS 1.0

### Arcade-style Game

**Pros:** Fast-paced action; extremely challenging in higher levels. **Cons:** Master disk must be inserted at the start of each playing session; only three scenarios.

**Requires:** Mac 512KE. **Company:** Brøderbund Software. **List price:** \$39.95.



Straight from the silver screen to the video arcades, and now playing on your Mac—it's Star Wars.

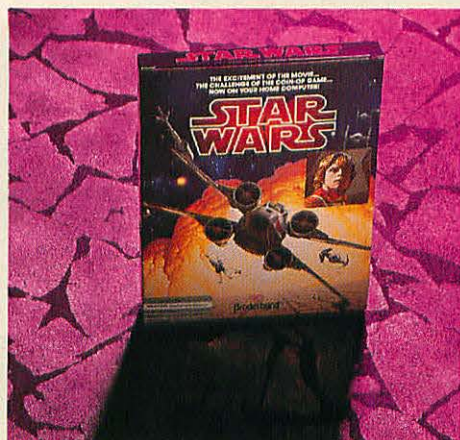
Under an agreement with Tengen (a subsidiary of Atari Games) and Lucasfilm, Brøderbund Software licensed the rights to produce a Star Wars game. Based on the popular coin-operated video game, this shoot-'em-up features three play scenarios and three starting levels.

As Luke Skywalker (defender of all that's good, pure, and wholesome in the universe), your task is to pilot an X-wing fighter through as many attack waves as possible. Your ship begins each game with nine protective shields. One is lost each time the ship collides with an object or is hit by enemy fire. When all shields are gone, the game ends. Each round, or wave, consists of three sequences, as described below. As a wave is completed, the sequences repeat—with faster enemies and increasingly complex obstacles.

#### The Sequences

In the first sequence, you must use your fighter's wing-mounted laser cannons to destroy the TIE fighters that defend the Death Star. If a fighter goes unblasted for too long, it fires back with deadly fireball bursts. Darth Vader is also out to get you. Unlike the TIE fighters, his ship cannot be destroyed. The best you can hope for is to stun him a bit, while racking up points.

If you manage to make it through deep space, you'll be transported to the surface of the Death Star to do battle with the laser towers. The more tower tops you hit, the more bonus points each succeeding one will be worth (up to a maximum of 50,000 points). The towers are also firing at you, so you'll spend a fair amount of time dodging fireballs and avoiding collisions.

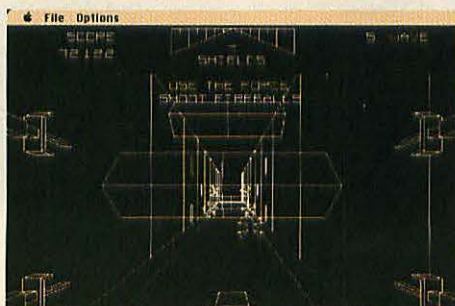


In the third sequence, you must find the exhaust port (located in the trench between the two halves of the Death Star) and shoot into it to destroy the Death Star (see "Down the Trench"). The trench uses robot lasers to defend against intruders. There are also strategically placed catwalks—some against the walls and others that span the trench—that you must dodge on your way to the exhaust port.

#### Features and Options

Star Wars offers 3-D graphics drawn from Luke's perspective in the cockpit of the X-wing. Although the drawings are hollow objects (wire-frame graphics), they enhance the game's action and excitement. Star Wars has good sound effects and includes snippets of digitized sound from the movie, such as Han Solo congratulating Luke on blowing up the Death Star.

Each game can be started at wave 1, 3, or 5. Unlike the other levels, wave 1 only



#### Down the Trench

*The trenches have two types of obstacles, stationary catwalks and moving fireballs. Watch for blinking lights along the walls; they're laser cannons. Complete this sequence and you'll earn a bonus shield and the right to move on to the next wave.*

includes sequences 1 and 3, making it the easiest to complete. If you begin at wave 3 or 5, a large bonus score is offered for the wave's completion. But if you collect the bonus for 3, the bonus for wave 5 is unavailable. The moral: the higher you start, the larger the potential bonus.

Star Wars uses an arcade method of recording the ten highest scores. You use a cross-hair cursor to select the letters in your initials. Other play options allow you to set the sound volume, pause the game, reverse the meaning of up and down mouse movements, and clear the high-score roster.

#### Please Insert the Original Disk

Like it or not, even if you've copied the program to your hard disk, each playing session must be validated by briefly inserting the program master disk. Any time you quit the game or restart the Mac, you must produce the master disk again to begin play. Lose the disk and you can kiss Star Wars goodbye.

Star Wars offers plenty of arcade action and will prove cheaper and more convenient than popping quarters into the arcade version. After you work out a basic strategy for each sequence, however, further advancement through the waves comes down to an issue of hand-eye coordination. Players may find themselves topping out after a few days, limiting the game's continued play value.

#### The Wisdom of Experience: Tips

- In sequence 1, shoot Darth Vader's ship as often as possible. Although you can't blow it up, it's worth 2000 points per hit. Also, each time it's hit, its attacks will temporarily stop.
- In sequence 2, concentrate on the towers rather than the bunkers on the ground. The more towers you hit, the faster your points will accumulate. To destroy the towers, you must hit their tops.
- In sequence 3, the name of the game is survival. It's often easier to dodge the fireballs than to shoot them.
- If you have a trackball, use both hands—work the ball with one and use the other to press the button as fast as you can.

—Steven Schwartz

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# WINDOW SHOPPING

by Lawrence Stevens

*This month I look at a number of special-purpose programs: an algebraic problem solver, a credit card-authorization program, a golf-score analyst, and a church-office organizer.*

## The Algebraic Proposer 2.0

I admit to a fascination with, along with a basic ineptitude for, algebraic word problems. Every once in a while I pick up a book with a title like *Games for the Incredibly Intelligent* and try to puzzle out, usually to no avail, such things as at what point two trains approaching each other at varying speeds are likely to collide. The Algebraic Proposer (\$79.95 from True BASIC) is just what I need to solve those problems. It helps systematically convert a word problem into mathematical form, it provides tutorials to help sharpen problem-solving skills, and it includes a tutorial generator that makes it easy for teachers to create their own tutorials.

The Algebraic Proposer requires that you break down each of the givens in the word problem into three parts: How Many, What, and Notes. You might, for example, type 105 for How Many, mi/hr for What, and



The speed of train A for Notes. The program assigns each of these givens a letter designation, which takes up one line in the Pad. So, in our example the line would read:

A:105 mi/hr The speed of train A.

Once all the givens are entered, the program offers a number of ways to help solve the problem. You can use the letter designation as a quick way of solving mathematical operations. If the lines contain different units, The Algebraic Proposer either automatically provides the correct unit that should result from the mathematical operation, or it prompts you to supply the correct unit. The program doesn't, however, have a database of conversion units, so if you try to add feet to yards, it asks you to convert one to the other. If, as in the case of apples and oranges, neither unit can be converted to

the other, the program asks you to supply a common category.

Whenever you replace a variable, such as  $t$  hours, with a number ( $t=8$ ) in one section of the Pad, the program replaces all other occurrences of that variable with the same number. This helps when attempting to solve problems through trial and error.

The Algebraic Processor uses two types of graphical displays to help you find the solution. One is a representation of the problem's plan showing how the quantities are dependent upon each other (see "View of the Plan"). The other is a plot that compares two relative values such as the velocity of a train to time.

When you use the program in the tutorial mode, it prompts you to take the steps required to solve the problem. When your response is wrong, the program cancels and asks you to try again.

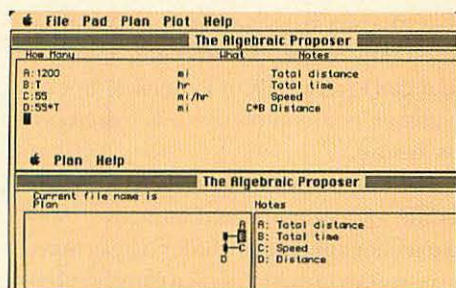
For algebra teachers, students, or anyone who, like me, would like to be able to solve a word problem once in a while, this is an excellent program.

## Credit Card DA 2.0

Credit Card DA (\$249 from E.E.S. Companies) provides a relatively inexpensive means for small businesses to process and authorize major credit card purchases. Because it is a desk accessory, it can be used as part of a Mac-based point-of-sale system.

You type the credit card account number, expiration date, and customer name into the Credit Card DA screen. Based on the credit card number, the program displays a picture of the card. If the number is invalid or the card has expired, the program notifies you and won't let you continue until you've reentered valid data.

(continues)



### View of the Plan

This composite screen shows an algebraic problem entered into The Algebraic Proposer's Pad (top) and the plan generated by the program (bottom). (In the application, both screens cannot be viewed at the same time.) The quantities A, B, and C in the Plan screen were input. D represents the quantity computed. The lines show that D is based on B and C.



Once the input is complete, select the Dial Authorization button and Credit Card DA dials the bank's telephone number and sends and receives the information, displaying the authorization number on your screen. Depending on your selection, the program sends a request for either an Authorization and Ticket, an Authorization only, or a Ticket only.

The DA also does batch transactions (used mostly in mail-order applications) and credit transactions (when a customer returns merchandise). Credit Card DA also checks the status of your merchant's account, and if you get a message from the bank to place a voice call, it dials the number and prompts you to pick up the telephone handset when the connection is made.

Before you receive Credit Card DA, you must provide E.E.S. with your authorized merchant ID number, which E.E.S. embeds in your copy of the program. The DA works with the two major bank standards: Electronic Data Capture and Electronic Transfer Capture.

While the features might seem a bit scant to justify the cost, the alternative of a credit card terminal is much more expensive. If you are considering an automated credit card-authorization system, this is a reasonable choice.

### Personal Golf Stats 2.0

Three things have to be considered when analyzing golf: the golfer, along with his or her performance history and handicap; the course and its rating; and the game scores. Personal Golf Stats (\$79 from Creative Computer Resources) takes these three considerations into account and comes up with a host of analytical data.

Personal Golf Stats allows you to create databases for up to ten golfers playing on any of 50 courses. You can view the data in four windows that appear on the screen concurrently. The Golfers window lists the golfers' names. When you select a name, the Golfer Data window displays the number of recorded games, the handicap, and the differential for the selected golfer. The Course window contains course ratings and hole pars. After selecting the course and the golfer, you enter scores in the Scores window.

The most powerful feature of Personal Golf Stats is its 14 graphs. You can display a graph containing a golfer's score, handicap, or differential for games played on a particular course. It can portray a golfer's score, putt, and par on a hole-by-hole basis on a selected course, and it can show the percentage of times the golfer made par or better at any hole.

Determining differentials or handicaps using a calculator takes only about ten minutes, so if you play golf once a week or so, you probably won't need Golf Stats. But for serious golfers, tournament officials, team officers who have to track a number of golfers and courses, or anyone who needs statistical golf graphs, Personal Golf Stats allows more time chasing the ball and less time chasing paper.

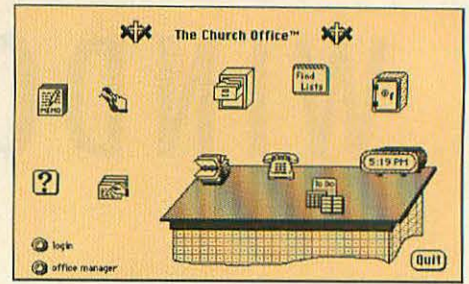
### The Church Office 1.1

The typical church office has a computer and a small army of part-time volunteers, many of whom have never used a keyboard. The Church Office (\$395 from TLC Software) is a HyperCard-based organization system that helps church office workers keep track of parishioners: their activities, interests, and contributions.

Although somewhat similar to the HyperCard linked-module organization stacks, The Church Office is much more limited in its number of modules and the interconnectivity of those modules. But in terms of ease-of-use and its ability to handle a large number of different users, many of whom might be working on the same project, The Church Office is divine.

Each user is assigned specific read and write privileges on each of the modules and must sign in with a name and password before accessing the stacks. The first card contains a list of messages, which can be instructions from the pastor or church office manager, or information from another volunteer, giving the status of a particular project.

The Records module, accessed through the file-cabinet button in the Church Office card, contains file folders for each family and a file card with name, address, and phone for each family member (see "The Church Office Modules"). At the bottom of the Records card are three buttons: Time and Talent, Committees,



### The Church Office Modules

*The Church Office card is the main screen. It contains buttons that allow you to access all the modules of the program.*

and Christian Education. Each button brings you to a card that contains a set of check boxes. When you click on any of these boxes, the program displays a second card of check boxes that further define the activities or interests. For example, the Building and Properties card contains nine check boxes including Spraying Weeds, Carpentry, and Plumbing. The program can be customized by deleting or adding check boxes or modifying the check-box labels. TLC will change The Church Office's labels and icons to fit any denomination.

The power of the check boxes lies in the reports that can be generated. You can get a list, either on screen or printed, of all individuals who have specific sets of boxes checked.

The main problem with The Church Office is that, unlike other HyperCard-based organizers, it does not cover all church activities and administrator's responsibilities. For example, The Church Office doesn't have a telephone log or a text-editing feature for creating memos, and it can't track bills or expenses. But its advantage is its simplicity; it is extremely easy to use.

The one or two Help screens for each module are complete and attractive. And the excellent manual includes instructions on basic activities such as scrolling, as well as advanced activities such as creating new buttons. This application is so friendly, you'll be tempted to invite it to your next church meeting. **M**

**See Where to Buy or circle 725 (The Algebraic Proposer), 733 (Credit Card DA), 808 (Personal Golf Stats), or 729 (The Church Office) on reader service card.**





The slide below shows the kind of output you'll get from an ordinary film recorder. The slide above was produced with the new 33 bit LFR Plus™ (11 bits per color). Notice the incredibly smooth transition between colors, with virtually no band-

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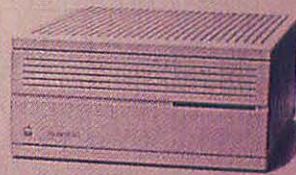


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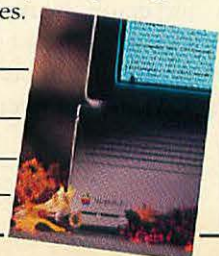
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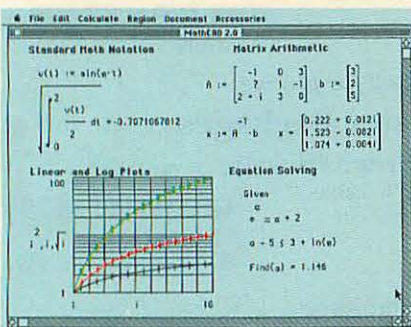


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# NEW PRODUCTS

**Edited by**  
**Mary Margaret Lewis**

*This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.*

## HARDWARE

### Drive 2.4

2.4MB-capacity 3 1/2-inch floppy drive that handles all 3 1/2-inch disk formats (HFS, ProDOS, MS-DOS). Compatible with SE/30 and later models, or any Mac upgraded with the SWIM disk controller. \$495. Kennect Technology, 408/370-2866, 800/552-1232.

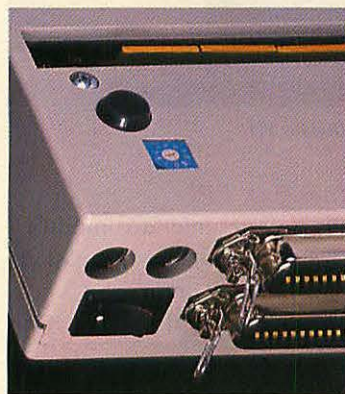
### Flatbed Image Scanners

Legal-size flatbed image scanners (models TF80 and TF30) that scan images at 300-dpi resolution. TF80 is an 8-bit gray-scale scanner that supports up to 256 levels of gray and can be used in 8-bit or 4-bit gray scale as well as halftone and line-art modes. TF30 supports line-art and halftone modes and includes 15 halftone patterns to simulate gray scale. \$1995. Touch, 415/770-1800.

### IDSPro

Series of seven portable hard disks designed for high-capacity storage. Units weigh less than 3 pounds and come

in 20MB, 30MB, 40MB, 60MB, 80MB, 100MB, and 200MB capacities. Prices range from \$695 to \$2895. Integrated Data Storage Systems, 408/441-0500.



**IDSPro**

### Linkstar 8

Self-configuring star controller that uses a method of drop-linking to reduce network traffic. Requires no additional network-management software. Comes with bidirectional LEDs that indicate the active send-receive status of each line. \$775. Thor Manufacturing, 800/346-4694.

### MacKit 140

140MB hard disk with installation kit for plug-and-play compatibility. Has 23-millisecond average access time and 10 megabits-per-second data-transfer rate. Includes connecting cable, user manual, and disk-installation and management software. \$3595. Toshiba, 714/583-3108.

### MaraThon Racer

Cache board designed to accelerate performance of Mac II by 36 to 68 percent. \$259. Dove Computer, 919/763-7918.

### MBC-DAC and MBC-GAD

MBC-DAC and MBC-GAD are plug-in, piggybacked expansion boards for the MBC-625 data-acquisition system for the Mac II and SE. MBC-GAD performs 16-bit analog-to-digital conversion at 16,000 samples per second. MBC-DAC provides two independent 16-bit analog output channels capable of processing data at 100,000 samples per second to voltage accuracies of 0.006 percent. MBC-DAC \$475; MBC-GAD \$550; MBC-625 \$1290. MetraByte, 508/880-3000.



**MegaScreen Rival System**

### MegaScreen Rival System

19-inch monochrome dual-page display monitor with 1-bit interface board, tilt/swivel stand and required cabling. Compatible with Mac Plus and later models. Mac Plus

model \$1748; all others \$1698. Mega Graphics, 805/484-3799.

### Mitsubishi Thermal Printers

Color thermal printers compatible with all color-imaging applications. Model S340-10 is a sublimation thermal printer and G370-10 is a thermal-transfer printer. Both are compatible with IBM PC and Mac II computers and can accommodate up to four different paper or transparency-film sizes. G370-10 \$5995, S340-10 \$13,995. Mitsubishi Electronics, 213/515-3993.



**MSF-300Z Color Scanner**

### MSF-300Z Color Scanner

24-bit color or continuous-tone gray-scale scanner. Uses three 1-bit-per-pixel modes for scanning logos, charts, and photos: single-bit, multi-bit, and 24-bit. Compatible with Mac Plus and later models except for the Mac IICx, IBM PC, and PS/2. \$2195; Mac interface kit \$500. Microtek, 213/321-2121.

### M24L Monitor

24-inch monochrome gray-  
(continues)





scale monitor that has a display area of 17½ by 12¾ inches and enables two facing 8½-by-11-inch pages or a full B-size drawing to be presented in a one-to-one ratio. \$1995. Image Systems, 612/935-1171.

**M24L Monitor**

### **Multi In-Line Memory Modules**

4MB surface-mount multi in-line memory modules (MIMMs) for the Mac II, IIfx,

and IIfx. Provides four times the RAM as a 1MB SIMM in the same amount of space. 16MB minimum upgrade \$5380. Pinnacle Sales International, 408/559-8544.

### **Neotech Still Video Control Kit**

Remote-control kit for the Canon RV-311 still video player when used with the Neotech ImageGrabber NuBus gray-scale video capture board. \$99. Advent Computer Products, 619/942-8456.

### **Net-Lok I**

Unit designed to protect connection points in personal computer LAN systems from unauthorized access. Provides switch lock to electronically disconnect the computer from the LAN. \$39.95. Qualtec Data Products, 415/490-8911.

### **NuvoLink SC**

SCSI device that supports connection from any SCSI interface to an Ethernet network. Transceiver may be connected to the device. Comes with standard software and Apple's LAN manager and driver. \$495. Nuvotech, 415/331-7815.

**Omnifax PPI**

### **Omnifax PPI**

Plain paper interface module that receives fax transmissions and prints them using a Hewlett-Packard LaserJet II or

compatible laser printers. Stand-alone device connects directly to a phone line. \$1395. Telautograph Corporation, 213/641-3690, 800/221-8330.

### **Porta-Drive**

Portable CD ROM drive that comes with optional battery pack for use with Mac or IBM PC (or compatible). \$895. CD Technology, 408/432-8698.

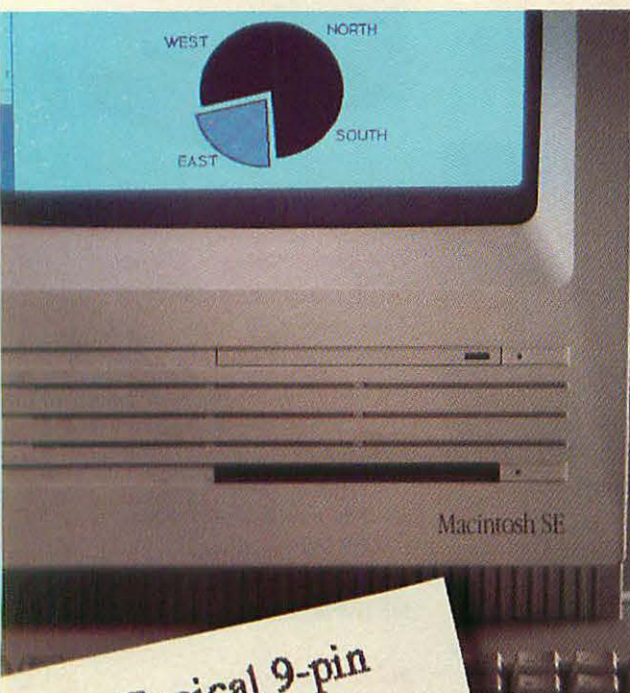
### **QMS ColorScript 100 Model 10**

Color PostScript printer with 300-dpi resolution; Pantone color simulation; serial, parallel, AppleTalk, and SCSI interfaces; and desktop design. \$9995. QMS, 205/633-4300.

### **ScuzzyGraph II**

SCSI-bus graphics controller that has 1024 by 768 and 1280

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The MacMatrix interface comes complete with connecting cable and works with all Toshiba 24-pin SL and SX series dot matrix printers and Macintosh Plus, SE and IIfx PCs with hard disk drives. Apple & Macintosh are registered trademarks of Apple Computer, Inc. For more information call 1-800-457-7777.



by 1024 resolution with eight colors. Compatible with Plus, SE, SE/30, Lisa, and Macintosh Portable. 1024 by 768 by 4 \$1395; 1280 by 1024 by 4 \$1995. Aura Systems, 619/438-7730.



**ScuzzyGraph II**

### **SFX Video Option**

Video option board that has video mixing to let users combine Mac-created screen images with images from any real-time video source. Lets you specify range of colors to use as a chroma key when using the board in 32-bit QuickDraw. Includes variable

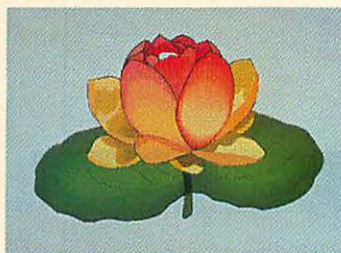
transparency and horizontal- and vertical-centering control. \$1495. RasterOps, 408/562-4200.

### **Spark-44**

A SCSI hard drive system that uses the Syquest SQ555 hard drive mechanism encased in a Spark enclosure. Includes high-power fan, SCSI ID switch, 110V/220V autoswitch power supply, and SCSI cable. \$1095. Spark International, 312/998-6640.

### **TekColor for the Macintosh**

Software color-fidelity system that helps users select screen colors to be duplicated by their output devices. Provides color-matching information on printers and video displays. Matches screen output to printer. Compatible only



**TekColor for the Macintosh**

with Tektronix ColorQuick Ink-jet Printer. \$50 separately; also bundled with Tektronix ColorQuick Ink-jet Printer. Tektronix, 800/835-6100.

### **Timbuktu/Remote Access Pack**

Package that includes 9600-bps full-duplex Remote/V.32 modem, Timbuktu/Remote software, and Macintosh-to-modem Remote/WakeUp cable. Compatible with Macintosh Plus and later models. \$1295. Farallon Computing, 415/849-2331.

## **SOFTWARE**

### **Color Window Workshop**

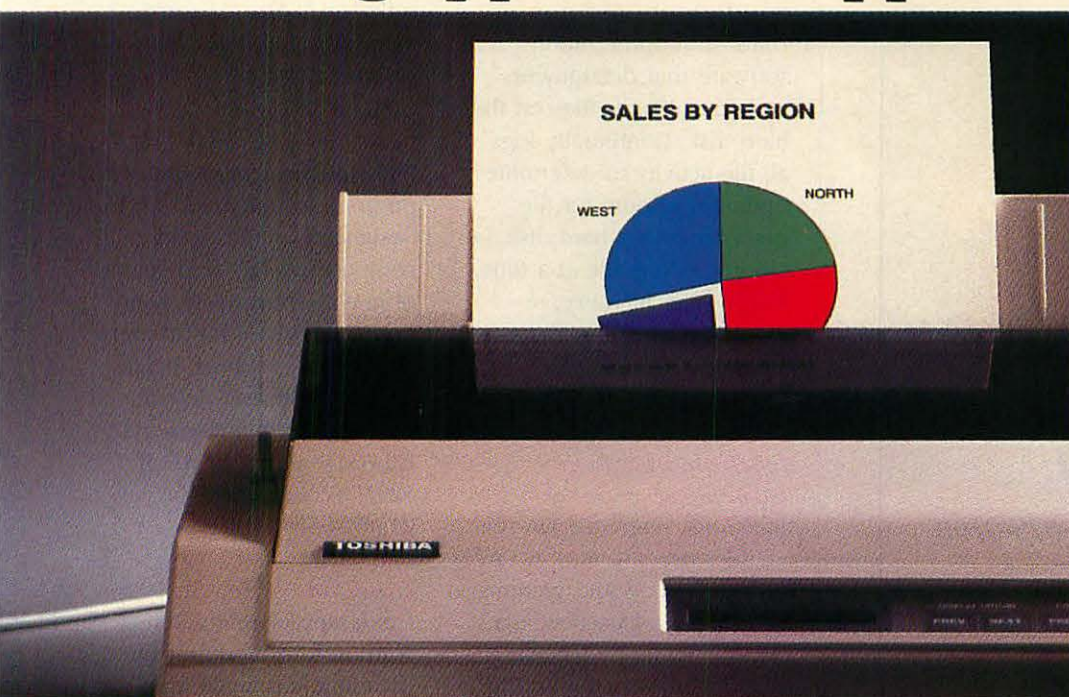
Collection of sample programs designed to help the programmer create color windows. Includes ROM-interface units and Text Fun folder for programming entertainment. 1MB min. memory. \$49.95. Amplified Intelligence, 916/737-1550.

### **CopyFlow**

QuarkXTension for QuarkXPress 2.11 designed for interaction within DTP workgroups. Has features for batch import and export of text, graphics, and image files; document-status reporting; and proofing of layout spreads to QuarkXPress 2.12. 2MB min. memory. \$795. North Atlantic Publishing Systems, 508/369-1931.

(continues)

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## **Delta Patient Management/Billing System**

Medical database software for data storage, appointment scheduling, epidemiology, medical billing, and tracking patients' records. Prints on HICF-1500 forms and produces invoices with up to two third-party payers and six line items. 1MB min. memory. License fee \$99.99; demo version \$18. Delta Medical Software, 901/372-4789.

## **DiskExpress II**

Hard disk-optimization software that defragments and consolidates files on the hard disk. Continually logs all file activity to determine optimum priority for file placement on a hard disk. Optimizes one file at a time. 512KE min. memory; requires System 5.0 or later version. \$89.95. Alsoft, 713/353-4090.

## **Electronic English Handbook**

Electronic reference DA that enables users to look up rules of punctuation and grammar, commonly misused words, and bibliography formats. Also includes parenthetical documentation. 512K min. memory. Single copy \$29.95;

\$25 per workstation for network use. Technology Training Associates, 617/497-5030.

## **EPS Corners Collection #1**

Collection of 65 graphic designs and 260 decorative corners in EPS format. Prints EPS format graphics on PostScript output devices. 1MB min. memory. \$130. Page One Publications & Graphics, 512/444-4593.

## **Kana**

HyperCard stack for students of the Japanese language. Contains both hiragana and katakana. Includes testing program. 512K min. memory. \$29.95 for individuals; \$50 plus \$2 per student for schools. Learn Kana, 606/266-5132.

## **KernEdit**

Software that allows you to edit, insert, and add kerning pairs to your fonts. Compatible with all fonts commercially available. 1MB min. memory. \$149. Pairs Software, 416/467-8784.

## **LabCAD**

Finite-element modeling program for engineers and designers. Creates solids; computes weight and center of gravity for models; computes properties for arbitrary beam cross sections, beam stresses, and user-determined forces. 2MB min. memory. LabCAD+ and LabCAD II \$295. Technicomm, 213/594-5878.

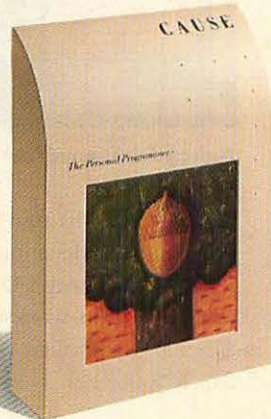
## **LandCadd**

Landscape-planning software in four modules: site planning and landscape design; irrigation design; (continues)



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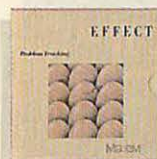
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Electronic Mail



Job Costing



Problem Tracking



Tax Preparation



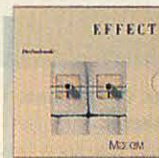
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construction details; and additional site symbols. 4MB min. memory. Site planning and landscape design \$695; irrigation design \$595; additional site symbols \$99; construction details \$89. LandCadd, 303/688-8160.

## LinoArt Packages

Series of four clip art packages—Mascots #1, Sport Figures #1, Borders and Tails #1, and Mascots #2—each of which contains 50 to 60 images. 1MB min. memory. \$149.59 each. Linographics, 714/639-0511, 800/854-0273.



LinoArt Packages

## Macintize

Software to help typesetters convert from using Compu-graphic brand typesetting machines to Macintoshes and PostScript output. Transfers files accumulated on Compu-graphic disks into Macintosh-formatted documents so conversion can be made without retyping existing files. 1MB min. memory. \$1495. Mumford Micro Systems, 805/687-5116.

## MacIvory Animation and Paint System

Graphics animation and paint workstation that includes Symbolics' MacIvory coprocessor board and 2-D and 3-D software. For industrial design, corporate presentations, scientific applications, and medical



MacIvory Animation and Paint System

illustration. 1MB min. memory. Paint workstation \$49,500; 2-D and 3-D paint and animation workstation \$75,900. Symbolics, 213/478-0681.

## MacMasterLink

Mainframe file-transfer product that supports DCA's MacIrma, Avatar's Mac-Mainframe, asynchronous VT100 and VT52 protocol, and has the ability to perform data transfer in the background under MultiFinder. Does not require programming. 1MB min. memory. DOS/Mainframe \$9500; VMS/Mainframe \$14,500. Performance Software, 804/794-1012.

## MailMate/QM

Macintosh-based bridge for CE Software's QuickMail that provides two-way exchange of text messages with Digital Equipment Corporation's DECnet mail (also known as VAX mail). Uses QuickMail's open-gateway architecture and Alisa DECnet for the Mac to make the Mac act as a DECnet node capable of receiving and sending DECnet mail. 1MB min. memory. Each bridge for 10 users \$950; for 30 users \$2450; for 100 users \$4950; for unlimited users \$9450. Alisa Systems, 818/792-9474.

## Marco Polo

Groupware for information (continues)



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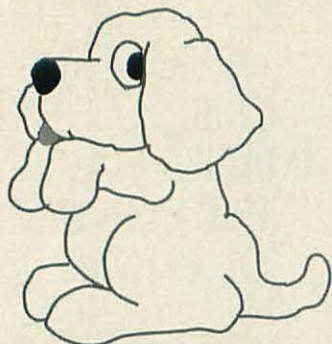
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Maxxi Cartoons

### Maxxi Cartoons

Cartoon clip art produced by West Coast artists Doug and Bob Hanson. Available in MacPaint and EPS formats.

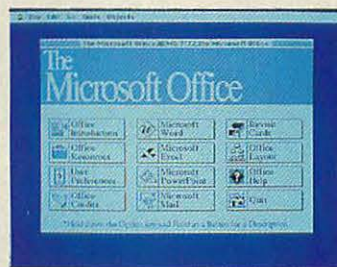
1MB min. memory. MacPaint  
format \$49, EPS format \$59.  
Hanson, 800/842-9327.

**MediSearch**

Communications and research tool that provides access to the National Library of Medicine's Medline service for doctors, health-care professionals, librarians, and researchers. Does automatic and manual searches, saves retrievals, and has index for complex terms. 1MB min. memory. \$149. Shoestring Solutions, 800/333-9462.

## The Microsoft Office

CD ROM disk that contains Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Microsoft Mail, and third-party products. Includes documentation. 1MB min. memory. \$949. Microsoft, 206/882-8080.



## The Microsoft Office

**MyAdvancedMailList**

Program for mailing-list management and organization of personal contact lists. Features include notes fields, the ability to manage multiple files, import and export data to and from word processors, and handle up to ten different label sizes. 512K min. memory. \$49.95. MySoftware Company, 415/325-9372.

### Neotech TimeFrame

Software for the Neotech

Image Grabber NuBus gray-scale video-capture board. Allows you to record and play back video sequences with time-lapse control. Video sequences captured with TimeFrame may be used with a variety of Macintosh programs. 1MB min. memory. \$199. Advent Computer Products, 619/942-8456.

**Omega**

Game that lets you design futuristic cybertanks and compete in free-for-all or team combat on a simulated battlefield. Players build the chassis, integrate weapons technology, and design electronics equipment to create the ultimate cybertank. 512K min. memory. \$49.95. Origin, 603/644-3360.

(continues)

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Software that enables users to set up AppleShare networks without a dedicated server, while maintaining compliance with the AppleTalk Filing Protocol. Lets any Mac, IBM PC, PC-compatible, or UNIX workstation on a LocalTalk or Ethernet network serve all users while functioning as a

workstation. 1MB min. memory. \$149 per server. KPR News, 818/347-7791.

**PlantManager**

HyperCard-based program designed to assist in the management of water- and wastewater-treatment facilities. Graphics depict actual plant process units so operators can easily locate and use regulatory and control information. 15-module set. 1MB min. memory. \$1200 to \$10,000 depending on the number of modules purchased. PlantManager, 703/722-3520.

**Plasmid Artist**

Scientific graphics application allows molecular biologists to easily construct publication-quality plasmid maps detailing recombinant DNA molecule-building strategies. Can

export diagrams as PostScript files to page-layout programs like Cricket Draw and PageMaker. 1MB min. memory. \$395. Genie Systems, 415/493-0972.

**PostPrint**

Raster-imaging software capable of interpreting PostScript and driving a variety of non-PostScript printers such as the HP LaserJet and the Apple LaserWriter SC. Allows a film recorder to become PostScript compatible. 1MB min. memory. \$295. TeleTypesetting, 617/266-6637.

**PostScript Display Fonts**

Set of five new display fonts made specifically for headlines. Each font has had approximately 2000 letter pairs considered in the kerning. 1MB min. memory.

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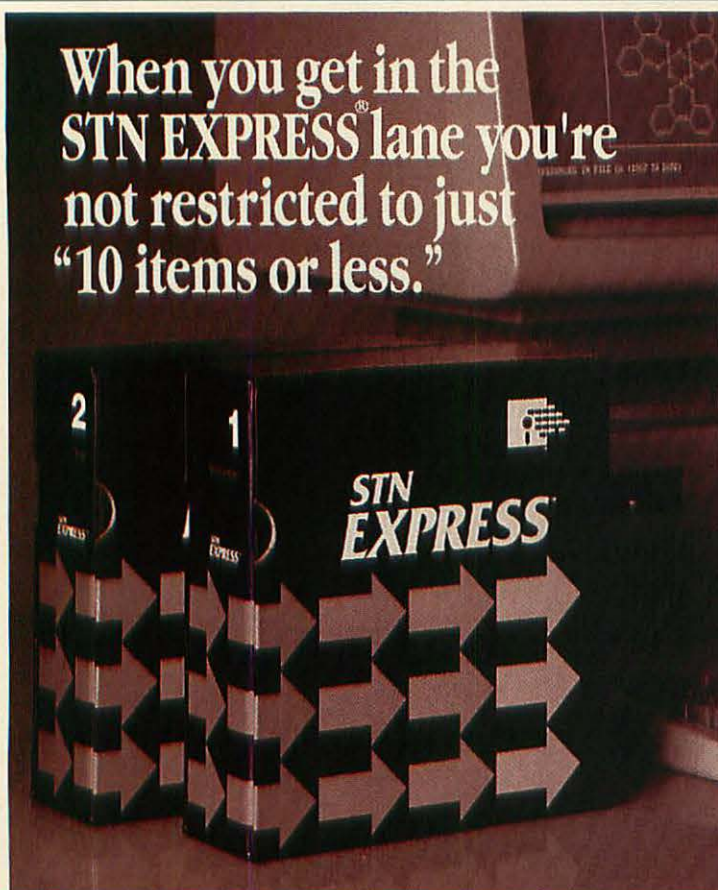
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Scrapbook desk accessory designed to be used in place of Apple's original Scrapbook. 1MB min. memory. \$69 plus \$12 s/h in the U.S. Seagull Engineering of Sweden, Box 909, S-220 09, Lund, Sweden.

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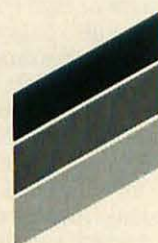
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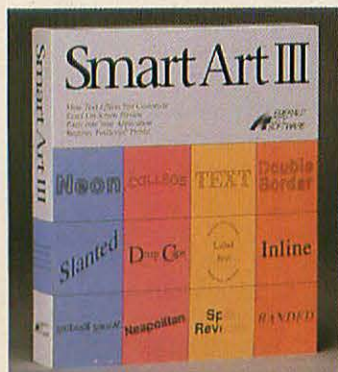
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dpi images in six volumes: Halloween, Happy Holidays, Springtime, Summertime, Autumntime, and Wintertime. 1MB min. memory. Each volume \$49; full library \$354. The Artmaker Company, 714/621-3282.

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design formats and a variety of patterns such as label text, banded text, and drop caps. 1MB min. memory. \$149.95. Emerald City Software, 415/324-8080.

**Springboard Publisher II**

Desktop publishing program oriented toward the average Macintosh user rather than professional designers. Includes EPS and PICT graphics support, 80,000-word spelling checker with suggestion capability, font sizes from 4 to 127 points, functional 200 percent view, and special effects from SmartArt laser text-effects DA. 1MB min. memory. \$199.95. Springboard Software, 612/944-3915.

**StrataVision 3D**

Three-dimensional software that lets you alter images created in architectural CAD

**StrataVision 3D**

packages. Lets you add special effects such as reflectivity and transparency to windows, marble texture to walls, and multiple light sources within rooms. Compatible with any architectural CAD package that outputs in DXF or IGES format, and with files in the Super 3D text or MiniCAD+ format. 1MB min. memory. \$495. Strata, 801/628-5218.

**SuperMailer+**

Bulk mailing-list software that

accommodates up to 200,000 addresses and has password protection. Includes search and sort capability, can import mailing lists from other programs, provides multiple report formats, and is compatible with mail merge software for personalized letters and laser envelopes. 1MB min. memory. \$295. AJL Systems, 404/998-6590.

**TalkBack**

Excel macro program that uses MacInTalk to read spreadsheet contents aloud to the user in either row or column order. Speech rate and pitch are variable according to user preferences. 1MB min. memory. \$20. Michael Sessions, 714/699-7318.

**Trendware XCAL**

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**Keyboard Flip**

stacks using a transparent grid window. Includes full-function macro editor. 1MB min. memory. \$149.95. Trendware, 203/926-1116.

## ACCESSORIES

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Clear acrylic stand that attaches to the underside of a keyboard. Allows you to flip up the keyboard when not in use. \$9.95. Basic Needs, 619/673-8228, 800/633-3703.

### La Cie Agio Furniture System

Vertical workstation that consists of a 30-by-33-inch desktop with matching overself, articulating monitor arm, and a bracket on the side for a Mac II CPU. Includes a wire-management channel that hides the wires from the CPU and monitor. \$399.95. La Cie, 800/999-0143.



**Mac II Muzzle**

### Mac II and Mac SE Muzzle

Hardware security devices for the Macintosh II and SE.

Protects the Macintosh II's internal hard disk and expansion boards by allowing the operator to block the power receptacle and lock down the central-processing-unit cover. Protects the SE internal hard disk by allowing the user to block one or both floppy drives and the power receptacle. \$79.95. Ergotron, 612/452-8135, 800/888-8458.

### Neon Banner Band


45 feet of 20-pound bond, pin-fed paper on a roll. Comes in red, green, pink, and orange. \$14.95. Banner Band, 800/333-0549.

### SCSI Terminator

SCSI-terminator connector with handle. \$12.65. Innovative Electronics and Computing, 303/458-5600, 800/458-4589.

## BOOKS & VIDEOS

### The Scanner Book

Illustrated guide to scanning discusses applications such as line-art and photographic scanning, gray-scale image editing, text recognition, PC facsimile, and bringing scanned images into desktop publishing programs. Written by Stephen Beale and James Cavuoto. \$22.95. Micro Publishing Press, 213/371-5787. 

.....  
To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, phone number (and two copies of software) to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. We reserve the right to edit submissions.

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# Quick Tips

Individual LaserWriter labels,  
hidden page numbers in PageMaker,  
using non-AppleTalk printers on  
TOPS networks, and more

by **Lon Poole**

**W**ould you like to keep people from pirating copies of your applications? Last August I suggested making an application icon invisible and opening the application indirectly by opening one of its documents. You can even make a special blank document just for this purpose. Adam J. Spector of Riverdale, New York, and other readers responded with a more direct solution, albeit a partial one. Using MacTools, which is part of PC Tools Deluxe/Macintosh from Central Point Software (503/690-8090), you can set a Protect option on any application. Attempting to copy a protected application using the Finder results in the message "That cannot be duplicated or copied." However, a protected application can be copied using Finder alternatives such as DiskTop from CE Software (515/224-1995) or using MacTools itself.

## PARANOIA STRIKES

Count on a virus to show up where you least expect it. Evan Coyne Maloney of Cos Cob, Connecticut, assumed his new hard disk, which came with a lot of free software, would be virus free. Later he discovered that one of the free demo programs carried the nVIR virus. Had he checked the hard disk before using it, he'd have caught the virus before it spread. The moral: Whenever you get a new application from any source, check the disk for viruses. If you get an application via modem, put it on a floppy disk and check it for viruses before using it. Files that have been compressed with a utility such as StuffIt or PackIt should be checked after you've decompressed them.

## ONE ORDER OF RESEDIT, TO GO

**Q** I have seen several references in Quick Tips to a program called ResEdit. Where can I get a copy?

*P. J. Petree  
Vero Beach, Florida*

**A** ResEdit, a utility for manipulating fonts, icons, and other resources in Macintosh files, is available from some user groups and from some online information services (because it's a large file, getting it via modem can take a long time).

You can also get the latest version from the Apple Programmer's and Developer's Association (APDA), Apple's mail-order distribution service for technical customers. To buy anything from APDA, you must establish an account, which involves completing and signing forms and paying an annual fee of \$20 for U.S. residents, \$25 for residents of Canada or Mexico, or \$35 for residents of any other country. ResEdit 1.2 costs \$30 from APDA.



## NERVOUS WITHOUT A BACKUP

**Q** Our school keeps its records using the MegaFiler program from Megahaus, a company that is no longer in business. We worry that the five-year-old start-up disk we have for MegaFiler will some day wear out. Is there a way of obtaining a new disk, or should we invest in a new database application to use with our Mac IIcx and LaserWriter IISX?

*Doris G. Breslow  
Scarsdale, New York*

**A** Your MegaFiler start-up disk is copy protected. You can remove the copy protection from MegaFiler 2.0 and most other protected software using Hard Disk Util from FWB Software (415/474-8055). After removing protection, you can make a duplicate start-up disk or copy the application to a hard disk. Be careful not to copy the System Folder from the floppy to the hard disk. You don't want more than one System Folder per disk.

You really ought to investigate other databases too. Lots has happened in the five years since you got MegaFiler. For help in selecting a midrange database manager, see "Choosing an Organizer" and "Database Showdown" in the June 1989 issue of *Macworld*.

## PRINT ONE LABEL

**Q** The one task I still do on a typewriter is make individual labels for manila envelopes. There are quite a few labeling programs out there, but they work with (continues)



sheets of labels and are intended for bulk mailings. If I try to reuse one sheet, printing one label each time through the LaserWriter, the sheet soon becomes tattered or else it jams the printer. Also, these labels are too small for a return address.

I do have a continuous roll of labels preprinted with my return address and logo for use on a pin-feed printer. Of course, they're a hassle to use—unload paper, load labels, print, unload labels, reload paper—but at least printing one label doesn't ruin a whole sheet.

I use KiwiEnvelopes [Kiwi Software, 805/685-4031] to print envelopes one at a time. I could use it for labels if I could find individual labels on envelope-size backing sheets. Any suggestions?

Steve Robinson

Address Unknown

**A** I use a word processor to print envelopes and labels one at a time. I position the text and graphics—my return address and logo along with the recipient's address—so that they'll print on a label when I feed it manually through the printer. On a LaserWriter II, the information goes at the top center of a portrait-oriented letter-size page. In Microsoft Word, I make the top margin 0.125 inches, the bottom margin 7.875 inches, and both the left and right margins 2.375 inches. The margins are different on a LaserWriter Plus or LaserWriter, because the information must go in the upper-left corner of a

landscape-oriented (horizontal) letter-size page. To print as near the edge of the label as possible, I click the Options button in the Page Setup dialog box and set the Larger Print Area option.

I use 4-by-3-inch labels that come two to a backing sheet (Avery S-6448); other sizes are available. These labels are meant for a pen or a typewriter, but they work fine in a LaserWriter. I sometimes print file-folder labels on a LaserWriter using a word processor and standard typewriter-style labels, such as Avery FF-3.

#### WINDOW POSITION MEMORY

**Q** Is there a way to save a window's position when you close a document in Excel 2.2? I would prefer not having to click the zoom box every time or to create a macro to do so.

Dan Eggleston

Austin, Texas

**A** Use the Save Workspace command (File menu) to save a document that contains a list of all open windows and their sizes and positions. Later you can open that workspace document to reopen—or reposition, if they're already open—the same windows at those same positions and locations.

#### NO BOLD LEADERS

**Q** Using PageMaker 3.02, how can you control the style of the leader characters that fill a space before a tab stop?

When some of the lines in a two-column list are bold and some are plain, the tab leaders are inconsistent.

Jacque Tilton

Iowa City, Iowa

**A** PageMaker doesn't let you directly set the type specifications of tab leaders. It formats tab leaders using the type spec of the letter or symbol that precedes them. So put a hard space (type Option-Spacebar) just before each tab character and format the hard space in the style you want the tab leader to be (see "Leader Style"). You can make the hard space unobtrusive by reducing its font size, but that will reduce the subsequent tab leader as well.

#### UNNUMBERED TITLE PAGE

**TIP:** PageMaker always starts its automatic page numbering with the first page of a document. If you have a title page, table of contents, and other front matter that you want unnumbered, put those pages at the end of the document. Hide the page numbers on those pages by turning off Display Master Items in the Page menu.

Sue Hotovic

Johnston, Iowa

You can also hide a page number by covering it with a small, borderless, opaque rectangle (choose None from the Lines menu and Paper from the Shades menu).—L.P.

#### HIGH-SCORE QUEST

**TIP:** When playing Crystal Quest 2.2, my daughter Tracy routinely scores 16 million plus and goes beyond the sixtieth wave.

Her method, however, isn't quite ethical. Here's how it works: as soon as you enter the gateway, but before the screen refreshes, press the Tab key to pause the game (see "Wait at the Gate"). Because the amount of time the game is paused gets subtracted from the time you've taken to complete the wave, minus times are possible. You effortlessly rack up bonus points and extra lives when the game is resumed.

The longer the game is paused, the more points and extra lives you get.

Robert W. Norwood

Galveston, Texas

(continues)

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'82 Toyota Corolla plain and simple	\$1500
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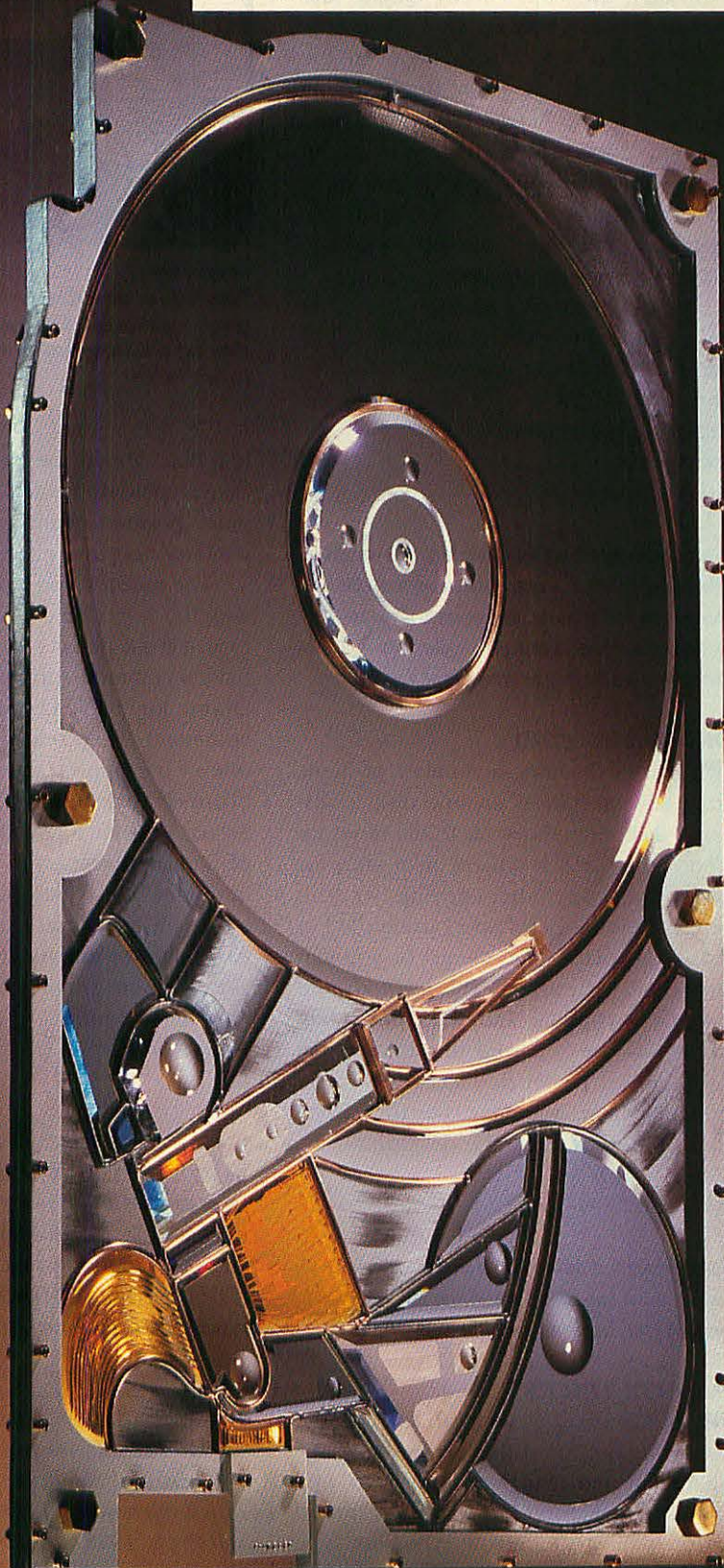
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**Leader Style**  
PageMaker normally sets tab leaders in the same style as the letter or symbol that precedes them (left). To set different specs for tab leaders, insert a hard space before the tab and give it the specs you want (right).



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Thomas Tisch & Andreas Lehmann  
Oakland, California*

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## QUICK TIPS

### HOW TO



#### Wait at the Gate

To rack up extra Crystal Quest bonus points (and lives), press Tab to pause at the end of a wave just as you enter the portal. You disappear from the screen, but the screen does not otherwise change until you press Tab again to end the pause period.

#### ONE PRINTER FOR ALL

**TIP:** I found a way to use SuperLaserSpool [from SuperMac Software, 415/964-8884] to share and spool a non-AppleTalk printer on a TOPS network. The printer can be an ImageWriter without an AppleTalk board, an Epson with a Grappler [from Orange Micro, 714/779-2772], or equivalent. This printer must be attached to the modem port of a Mac that has a hard disk with a large enough capacity to store spooled documents for the network.

Set up your network by installing SuperLaserSpool and its Laser Queue desk accessory on the printer server (the Mac connected to the printer) and on each client (the Mac you want to print from). You need a separate copy for each Mac because SuperLaserSpool may check the network for duplicate serial numbers. Next install a copy of the ImageWriter driver in each Mac's System Folder and select it using the Chooser. Select the modem port because the printer port is being used by the network. Then using TOPS on the printer server, publish (make available to client Macs) the hard disk drive to be used for spooling. Mount that drive on each client Mac using TOPS. On each client Mac, also open Laser Queue and click the Setup button. In the dialog box that appears, click the Drive button until the server disk drive's name appears. Make sure the Folder Name matches the name of the spool folder on that drive. The standard folder name is SLS Spool File. Click OK to dismiss the dialog box.

Each time you restart a client Mac, use

TOPS to mount the server disk drive used for spooling (unless TOPS does this automatically), then open Laser Queue and click the Pause button. This allows the client Mac to spool documents to the server but keeps the client from printing them. Only the server is able to print spooled documents on the printer attached to its modem port. If you don't click the Pause button, spooled documents may not print and an error message may appear on the server.

Now when you choose the print command from a client Mac, the document will spool to the server's disk drive and print on the printer attached to the server's modem port.

Joe Arnold

Atlanta, Georgia

To avoid documents printing in the wrong font, make sure all Macs have exactly the same font setup. If you use any non-Apple fonts, they must be installed in the same sequence. If you use a font multiplexer like Suitcase or Master Juggler, font distribution among open font files must be identical on all Macs.—L.P.

#### ORGANIZED COPY

**TIP:** Before dragging a number of items from several folders on one disk to another disk, drag the items to the desktop. There you can select them all at once for a one-drag copy. After copying, you can return them to their folders using the Put Away command (File menu) or you can drag them to the Trash. This method even expedites copying and then discarding items that are scattered throughout one folder. (The Finder deselects items after copying them, and it's easier to reselect them if they're all on the desktop.)

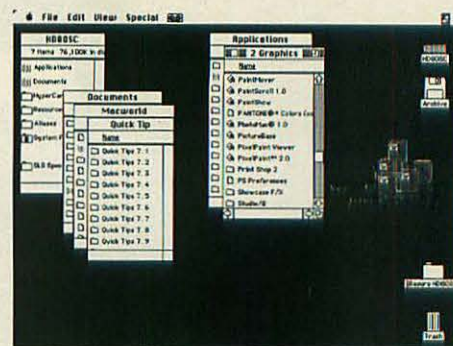
Terry Wilson

Mt. Holly, New Jersey

You don't need much desktop space to use this technique. Just pile icons on top of each other in a small area and select them by dragging a net around them (see "Copy a Pile").—L.P.

#### PALETTE TRICKS

**TIP:** In Canvas 2.0, you can tear off the following pop-up palettes by pressing the space bar and dragging: fill pattern, pen pattern, foreground color, background color, pen shape, arrow type, ink type (transfer mode), and zoom (magnification/reduction). The torn-off palettes do



#### Copy a Pile

Piling icons on the desktop facilitates copying them in a group to another disk. Later you can easily reselect them and either drag them to the Trash or return them to their folders.

not float above the document window (like HyperCard's palettes), however. You must position them so the document window does not obscure them.

The palettes also work in conjunction with the Select All command (Edit menu) to select all objects in a document that have a common attribute. First, press the Option key while choosing the Select All command. Then select an attribute from one of the pop-up palettes listed above. (Torn-off palettes don't work with the Select All command.) After selecting a set of similar objects, you can choose any attributes you want them all to have. In effect, this gives you a search-and-replace capability for graphic elements.

Alison Moore-Smith

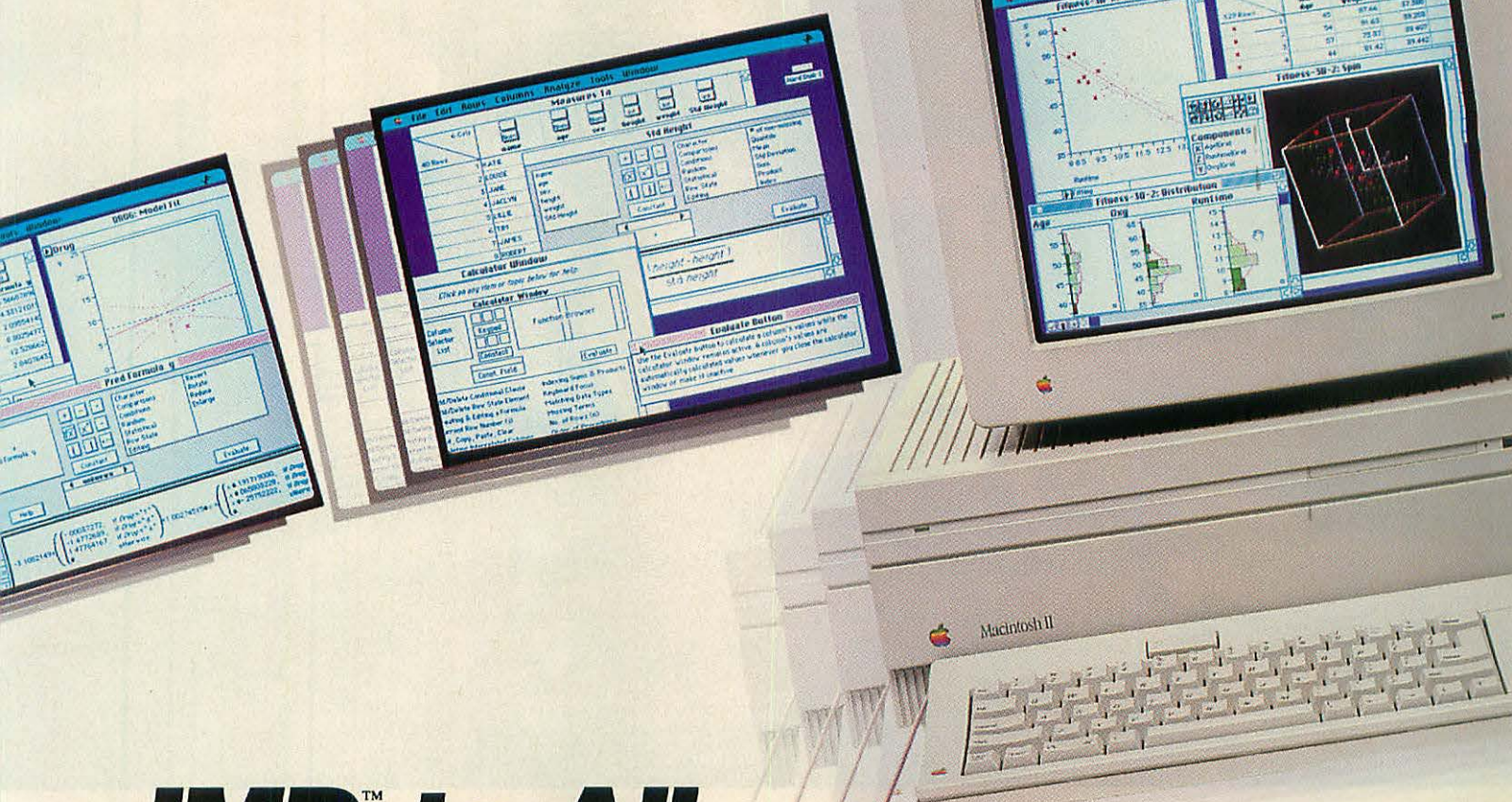
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Lon Poole answers readers' questions and selects their tips for this monthly column. His personal computer books include the quick reference guide HyperTalk (Microsoft Press, 1988), and a new book of Mac tips (to be published soon by Microsoft Press), Amazing Mac Facts.





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2	Expenses	Ledger								
3										
4				5000	5050	5090	5100	5110	5120	5130
5	Date	Reference	Total Entry	Wages	Wages Officers	Beans	Advertising	Amort	Auto	
6	1/31/89	CDJ-1000	5,956.66	5,954.66	0.00	0.00	0.00	0.00	0.00	
7	1/31/89	PRJ-1040	9,859.64	3,859.64	6,000.00	0.00	0.00	0.00	0.00	
8	1/31/89	GMJ-0002	300.00	100.00						
9	1/31/89	NSJ-CP01	1,275.00				95.00			
10	1/31/89	NSJ-TBAJ	900.00	(800.00)		100.00				
11	1/31/89	NSJ-RP-1	92.50							
12	1/31/89	NSJ-CP10	15,000.00	6,213.50						
13	1/31/89	Year to date	15,000.00	6,213.50						
14	2/28/89	WAG-2100	2,555.50							
15	2/28/89	CDJ-1000	10,474.85							
16	2/28/89	NSJ-CP01	1,140.00							
17	2/28/89	PRJ-1040	9,885.80							
18	2/28/89	NSJ-CP-1	485.07							
19	2/28/89	NSJ-RP-1	300.00							
20	2/28/89	NSJ-AP05								
21	2/28/89	NSJ-CP01								
22	2/28/89	Year to date	24,999.17							
23	2/28/89	Year to date	24,999.17							
24	2/28/89	Year to date	24,999.17							
25	2/28/89	Year to date	24,999.17							
26	2/28/89	Year to date	24,999.17							
27	2/28/89	Year to date	24,999.17							
28	2/28/89	Year to date	24,999.17							
29	2/28/89	Year to date	24,999.17							
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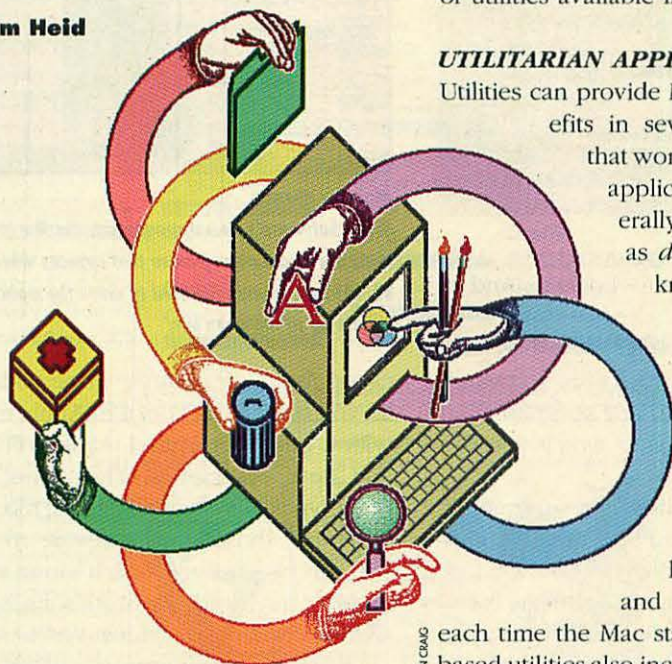
-Dr. Samuelson, Pepperdine University



# Getting Started with Utilities

There's a whole slew of utilitarian programs just waiting to take over your Mac chores and housekeeping

by Jim Heid



JOHN CRAIG

Utilities are the spice of computing life. I refer not to the local telephone or gas company, but to *utility software*—programs that make using the Mac easier and more convenient. Utilities form the supporting cast of a computer setup; they work together with the Mac's system software and with your application programs to improve the Mac's performance and enhance its operation.

Want to customize your favorite programs' keyboard shortcuts? Need help managing the files on your hard disk? Longing for a way to resurrect that file you accidentally threw away? Want to customize the colors your Mac II displays? Need an easy way to move files between programs or between a Mac and an IBM PC?

Utilities can perform these feats and many more. This month, I examine the most popular categories of utility software and spotlight several products from each group. Because there's such an abundance of utilities for the Mac, I don't have room to mention each one; so if I've left out a particular program, don't assume it's under par. Computer dealers, user groups, and mail-order software advertisements are good places to learn about the gamut of utilities available in each class.

## UTILITARIAN APPROACHES

Utilities can provide Mac-enhancing benefits in several ways. Utilities that work together with your application programs generally operate as *INITs* or as *desk accessories* (also known as DAs, these small programs are accessed from the Apple menu).

INITs, also called *start-up documents*, reside in the System Folder of a hard or floppy disk and load into memory each time the Mac starts up. Many INIT-based utilities also include a *Control Panel device* (CDEV) that lets you adjust their

settings using the Apple menu's Control Panel desk accessory. A DA or INIT might also add its own menu to the Mac's menu bar. (For details on how INITs load and operate and for advice on troubleshooting INIT-related problems, see "Start with Utilities," *Macworld*, October 1989.)

Utilities in this class have one common characteristic: their benefits can surface in any application, from a word processor to an engineering program. One example of an application-spanning INIT is Apple's MacroMaker, which lets you create your own keyboard shortcuts. Another example is Apple's Find File DA, which lets you locate a misplaced file by searching for text that appears in its name.

Instead of working together with your applications, some utilities perform their work alone. Separate applications you start from the Finder, these self-contained job specialists perform specific tasks, such as backing up hard disks, resurrecting lost files, or transferring files between Macs and other computers.

A well-stocked utility toolkit will combine programs from both camps. (For a summary of utilities described in this column, see "Utility Toolboxes.") Not listed are those that perform obvious tasks, such as hard disk backup and file recovery.

## NAVIGATION COPILOTS

As you become experienced with the Mac, you'll start wishing for easier ways to control your programs. You might long for more keyboard shortcuts to eliminate reaching for the mouse. Or you might want to automate frequently performed tasks, such as quitting one program, starting another, choosing a command, and then typing some text.

Navigation utilities let you streamline the Mac's operation to suit your work habits and preferences. For creating keyboard shortcuts and automating repetitive tasks, use a *macro* utility such as Affinity Microsystems' Tempo II or CE Software's (*continues*)





## HOW TO

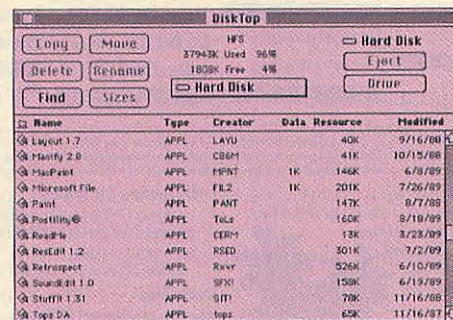
Both MasterJuggler and Suitcase II offer other goodies. Suitcase II can display the actual typefaces in a program's Font menu, instead of simply showing font names in the Mac's Chicago font. (Beyond's MenuFonts 2 does this, too.) MasterJuggler lets you assign a sound to any of nine events, such as inserting or ejecting a disk. (A \$10 INIT called SoundMaster, by Bruce Tomlin, also does this and was described in the November 1989 column.) And both Suitcase II and MasterJuggler can *compress* fonts and sounds so they take up less disk space. When a compressed font or sound is needed, the utility automatically *decompresses* it while loading it into memory, leaving the compressed version intact on your disk.

Hard disks can be hard work. It's great having megabytes of fast storage on tap, but as a hard disk fills up, managing its contents becomes increasingly difficult.

DiskTop and DiskTools II (part of the DiskTools Plus package) are DAs that mimic many functions of the Finder (see "Surrogate Finders"). Both let you copy, rename, and delete files, as well as start programs and open documents. But unlike the Finder, both also let you search for files according to a variety of criteria. With

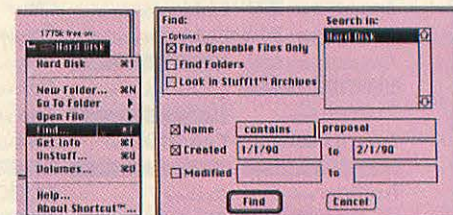
Shortcut and Findswell offer an even more convenient way to locate files. Both utilities are INITs that modify the standard Open dialog box all Mac programs use—a logical place to put file-searching features (unless you need to locate a file when using the Finder, whose Open command doesn't display the standard dialog box). Findswell adds a small button; click it, and a dialog box for searching appears. Shortcut turns the disk name that appears above the Eject and Drive buttons into a menu whose commands let you search for files, create new folders, and more (see “One-Stop Searching”).

The aforementioned file ferrets are useful only when you know part or all of the file name you're looking for. When you don't, consider a *text-retrieval* utility such as



**Electronic Arts' DiskTools II (top) and CE Software's DiskTop (bottom) allow you to manage disks, start programs, search for files, and open documents without having to return to the Finder.**

The Sonar programs operate as separate applications; Gofer is a desk accessory. All three utilities let you perform simple searches for a single word or phrase, or complex *Boolean* searches, in



**Working Software's Findswell and Aladdin Systems' Shortcut modify the standard Open dialog box that Mac programs display. Click Findswell's button (top left) and a dialog box appears (top right) that lets you search for text appearing in a file's name or Get Info text. Shortcut turns the disk name above the Drive and Eject buttons into a menu (bottom left). Shortcut can't search Get Info comments, but it does let you search for files created or modified between two specified dates (bottom right).**

Because Gofer is a desk accessory, it's more convenient than the Sonar series for day-to-day use. The Sonar programs, however, offer more sophisticated searching features. Sonar Professional, in particular, is the program of choice for serious researchers. It can assemble an index of words and phrases; search for synonyms; *(continues)*



## GETTING STARTED HOW TO

and even search for words that are within a certain distance of other words, such as each occurrence of *trade* that appears within five words of *deficit*.

### MORE HARD-DISK TAMERS

Another way to tame a hard disk's frontiers is to use a *partitioning* utility such as ALSoft's MultiDisk or Symantec's SUM Partition, included with SUM II. Partitioning utilities let you divide a hard disk's capacity into two or more *logical volumes*, each of which is treated as a separate disk that you can electronically insert and eject. By dividing a large-capacity hard disk into several volumes, you can manage and back up files more easily.

As you use a hard disk, its contents become *fragmented*—scattered across separate areas of the disk. *Defragmentation* utilities, also called *disk optimizers*, keep a hard disk running at top efficiency by rearranging its contents so that all files are stored contiguously. Symantec's SUM II and Central Point's PC Tools Deluxe both offer this feature; ALSoft's DiskExpress II is another popular disk optimizer.

Organizing a hard disk is one thing; keeping its files safely backed up is another. Backing up a hard disk involves copying its contents to another storage medium—usually to a dozen or so floppy disks. It's drudgery, to be sure, but you can make the process tolerable by using a *backup utility* such as Dantz Development's Retrospect, SuperMac's DiskFit, Microseeds Publishing's Redux, or Fifth Generation Systems' Fastback II. With a backup utility, you start by backing up the entire hard disk, inserting fresh floppies when necessary. After that, run the utility at regular intervals (every day or so) to back up new or modified files.

Chances are your backup routine will be as simple as the one I just described. You might, however, want to take advantage of the remarkable array of backup options that some programs—particularly Retrospect and Fastback II—provide. With Retrospect, for example, you can click on an on-screen calendar to specify backup intervals—once a week, every day, every other day, and so on. Subsequently, Retrospect automatically backs up your work at the specified intervals.

Even if you back up religiously, you'll probably lose a file now and then. You might trash one by mistake or encounter a damaged disk between backups. At such times, you'll want a *file-recovery* utility such as Symantec's SUM II, 1stAid Software's 1stAid Kit, or Central Point Software's PC Tools Deluxe. (A Mac version of the Norton Utilities, a popular disk utility in the IBM PC world, is scheduled to debut early this year.) By working intimately with the technical information that the Mac relies on to keep track of files, these wonder workers can often (though not always) recover deleted files or files stored on damaged disks.

Disk backup and recovery programs are complex enough to warrant a separate column. Next month I'll take a closer look at those utilities, along with the entire process of hard disk backup and disk maintenance.

### UTILITY POTPOURRI

We've toured the most popular utility categories, but I can't wrap up without giving a few more programs their due.

- *Cosmetic* utilities let you customize the appearance of the Mac's interface. Palomar Software's Colorizer adds color to scroll bars, menus, and every other element of the Mac's user interface (see "Color Your World"). Preferred Publishers' Personality, in development at this writing, lets you colorize the interface and give the Mac's buttons a three-dimensional look. Microseeds' Screen Gems lets you replace the Mac's gray desktop pattern with a color image.

- *Screen savers* blank the Mac's screen after a specified period of inactivity, preventing an image of the menu bar from being burned into the monitor's phosphorous coating. Popular screen savers include Fifth Generation Systems' Pyro and Microseeds' Dimmer (part of the Screen Gems package).

- *Screen capture* utilities replace the Mac's feeble ⌘-Shift-3 F-key by providing a slew of options for saving a screen image on disk. Mainstay's Capture (reviewed in this issue) lets you copy part or all of the screen—including pulled-down menus—or save it as a disk file, and Capture

(continues)

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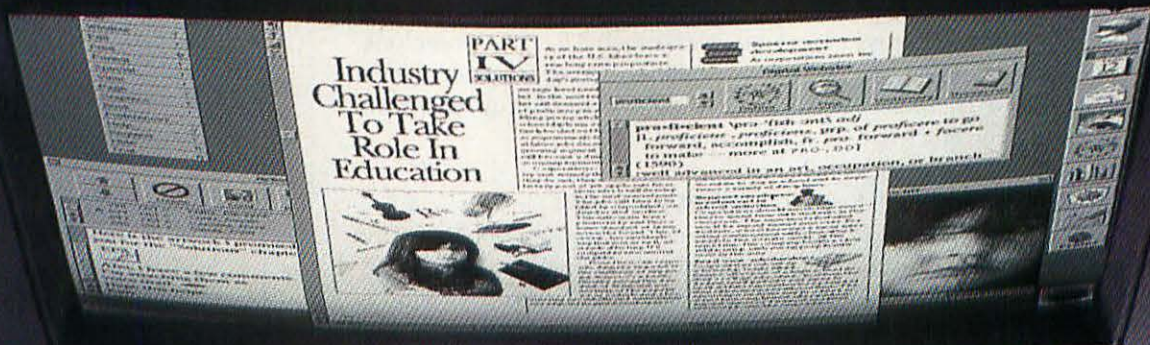
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# Industry Challenged To Take Role In Education

**PART IV SOLUTIONS**

As we have seen, the inadequacy of the U.S. labor force is reaching crisis proportions. The average literacy level of today's young adults is below the average level needed by the job market. In the next ten years, the job market will demand an ever higher level of proficiency in reading and math. Many young adults with only a high school diploma or worse, will effectively be shut out from the job market as demand for unskilled, manual labor jobs decreases. This ever growing segment of the population will become a drag on the economy due to increased unemployment.

Corporations can ill afford not to try and remedy this situation, for if they do not, they will not have a satisfactory pool of job applicants from which to choose the workers to fill the positions which will develop in the next several years. The jobs will have to be filled by unqualified, undereducated workers. This will create lower productivity and thus a lower standard of living across the board. This, of course, has worldwide implications as well, adversely affecting U.S.

**Sponsor curriculum development**

As corporations assess key skills required over the next several decades, they should cooperate with high schools and junior high schools to develop programs that breed interest and proficiency in these areas. Corporations can even sponsor extracurricular activities such as science, computer or speech clubs that would reproduce real-life situations. Exposure, experience and excitement about the field can grow together.

**Reward those who graduate**

Corporations can offer guaranteed part-time employment to students who agree to remain in school and pursue courses preparing them for careers in their chosen field. Students perceive an incentive to stay in school and to experience a variety of disciplines.

**Support employee involvement in school activities**

Corporations should encourage executives to spend time with students in the classroom. The many hours forfeited would be repaid many times over. For students, school becomes a more interesting environment with clear attachments to the outside world. At the same time, the company builds a close relationship with young people with roots





The words are those of Jonathan Seybold, perhaps the most respected voice in desktop publishing. His newsletter, The Seybold Report, reaches some 200,000 publishers—of whom we estimate 199,990 have never even tried a NeXT™ Computer.

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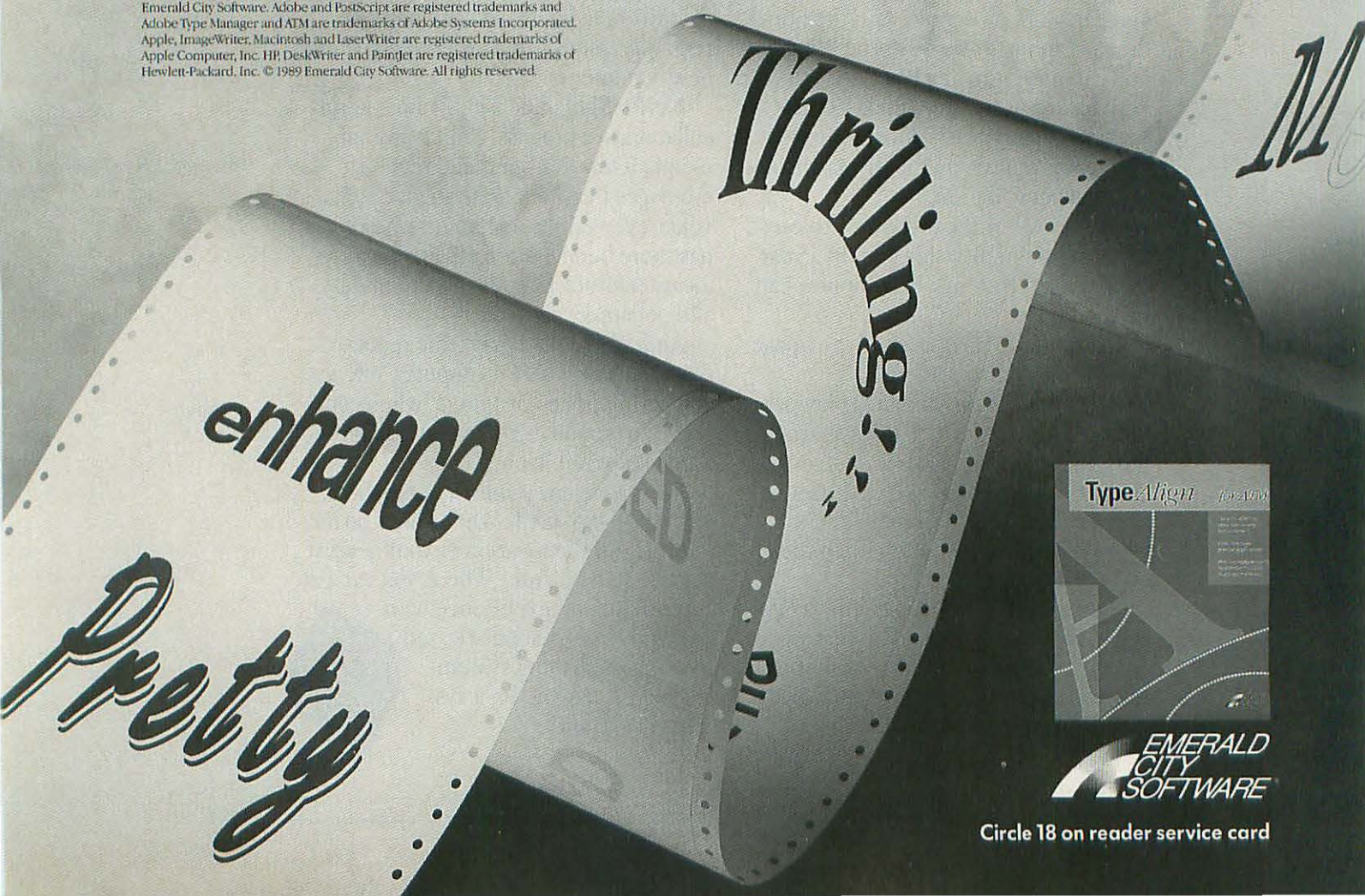
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## GETTING STARTED HOW TO

supports color displays and large screens. Preferred Publishers' Exposure provides similar options.

▪ **Workgroup** utilities let you turn LocalTalk network cabling into a medium for coworker communication and brainstorming. If you're using LocalTalk cables only



### Color Your World

Tired of seeing black-and-white menus on your expensive color monitor? Try Palomar Software's **Colorizer**, which lets you add color to every element of the Mac's user interface. Shown here: the patriotic 4th of July color scheme, one of several schemes included with Colorizer.

to connect Macs to laser printers, you're wasting your wires. Farallon Computing's remarkable Timbuktu lets you control one Mac from another Mac on the network, or simply observe how others are using their Macs. It's also ideal for transferring files between machines. CE Software's In/Out lets you keep track of who's in the office—it's an electronic version of the message boards many offices use. Mainstay's MarkUp allows group editing of documents as they journey through the approval loop—it's an electronic red pencil that works on local networks. Solutions' SuperGlue II provides document-annotation features, too.

▪ **Spoolers** make the long wait for a slow printer less annoying by intercepting and storing documents on disk and then sending them to the printer as it becomes available. Although you won't get your output any faster, at least your Macintosh won't be tied up waiting for files to print. MultiFinder provides *background printing*, too, but only to PostScript laser printers, not to ImageWriters. SuperMac's SuperLaserSpool supports ImageWriters,

and it doesn't require MultiFinder—good news if your Mac has only 1MB of memory.

▪ **File-transfer** utilities—such as DataViz's MacLink Plus/PC and Traveling Software's LapLink Mac—bridge the gap between the Mac and the IBM PC and many popular laptops. Both include a cable and software for your Mac and PC. With MacLink Plus/PC, you manage file transfers using the Mac's software, with LapLink Mac, you use the PC's software. If your Mac has Apple's new 1.4MB SuperDrive floppy drive, consider Dayna Communications' DOS Mounter, an INIT that lets you insert 3½-inch PC disks in a SuperDrive and work with them using the Finder.

▪ **File-compression** utilities such as Stuffit Deluxe, which should be out by the time you read this (Aladdin Systems Inc., Deer Park Center, #23A, Aptos, CA 95003), let you compress files so they'll use less disk space (for archiving files and for sending and receiving them via modem).

▪ **INIT managers** let you selectively disable INITs without having to drag them out of the System Folder. Popular INIT managers include CE Software's Aask (part of the MockUtilities package), Microseeds' INITPicker, and Natural Intelligence's Inix (see *Reviews*, *Macworld*, October 1989). I use a free INIT manager called Init, by John Rotenstein. You can get a copy through online services such as CompuServe or from a local user group or shareware clearinghouse.

Utilities that let you manage utilities—now that's the sign of a thriving marketplace. There's no shortage of utilities for the Macintosh, and that's proof of a few things: the gaps still present in the Mac's system software, the vitality of the Mac itself, and most of all, the desire of Mac users to personalize and customize their machines. ■

See *Where to Buy* for contact information.

*Jim Heid is a Macworld contributing editor who each month focuses on a different aspect of Mac fundamentals. His latest book, coauthored with Peter Norton, is Inside the Apple Macintosh, an advanced user's guide published by Brady Books.*

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# Insights on MacPaint 2.0

Shortcuts and  
workarounds for  
the Mac's original  
paint program

by Erfert Fenton

**M**acPaint? Why, you might ask, are we publishing tips for MacPaint? Because a lot of people still use this primordial paint program. You may have inherited the original MacPaint from your grandfather, who got it for free when he bought a 128K Mac; or you may have waited until Claris gave the program a face-lift, and purchased version 2.0. While most of these tips apply to MacPaint 2.0, some are generic enough to work with earlier releases.

## INSTANT TOOLS

When you use any tool except the text tool, pressing *T* places the tool palette's close box under the cursor, allowing you to quickly close the tool palette. Pressing *T* again makes the tool palette reappear. The same trick works with the *P* key and the pattern palette.

## HAND ME THAT LAST TOOL, PLEASE

Ever wish you could toggle between one tool and another without using the tool palette? In many cases, pressing  $\text{⌘-A}$  will reselect the last tool you were using.

## THE LASSO ROUNDUP

Some people don't realize that you don't have to painstakingly surround an entire selection with the lasso. If you surround most of an area and then release the mouse button, the end point of the lasso

make the background show through, use the pencil tool to make a single-pixel incision (click on a black pixel to make it white) in the foreground object's outline before you lasso it. Then, when you drag the selection it will be transparent, allowing anything it passes over to show through. (Note that if the object contains enclosed areas—say, a circle within a circle—you'll have to make incisions in those outlines to make them transparent too.)

## CUSTOM RUBOUTS

You can quickly erase an area by selecting it with the lasso or marquee and then pressing the Delete key (or the Backspace key, depending on your keyboard). Another way to erase a large portion of a drawing is to draw a borderless white rectangle over the area to be erased.

To erase a small area, simply double-click on the brush icon to bring up the Brush Shape selector. Select a small brush. Then, choose white from the pattern palette and use the white brush as an eraser.

## SPEEDIER SCROLLING

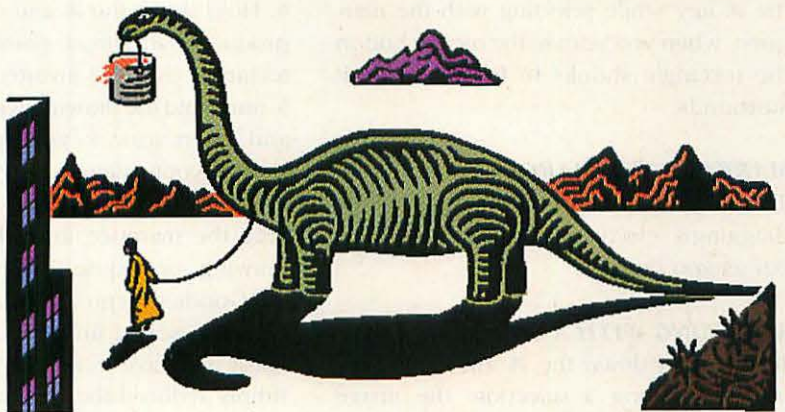
When you're moving around a painting via the scroll bars, hold down the Shift key to increase the scrolling speed.

## PATTERN PICKUP

If you're looking for just the right fill pattern, let MacPaint do the browsing for you. Rather than editing a pattern one pixel at a time, you can flip through an array of patterns and choose the ones you like. With a drawing on the screen, double-click any pattern in the pattern palette to open the Pattern Edit window. Click the arrow pointer anywhere on the drawing, and you'll see the underlying pattern in the Edit Pattern box (see "Pick a Pattern"). Keep clicking until you see a pattern that suits you, then click OK to add it to the pattern palette. (Remember, the new pattern will replace the original pattern you opened, so make sure you don't wipe out any patterns you wish to keep for the current document.)

## GETTING CENTERED

In the original MacPaint, you could center a drawing on a page by moving it in Show (continues)



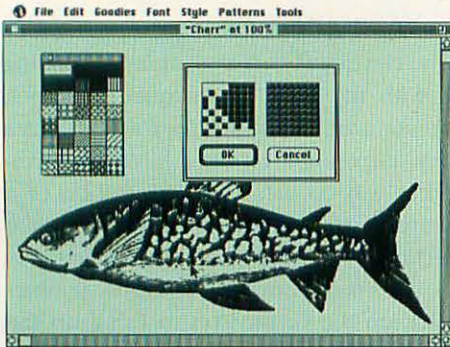
line will join up with the starting point, closing the loop around the object.

## MAKING THINGS PERFECTLY CLEAR

When you lasso an object and drag it over another one, the background object will be obscured by the foreground one. To



Page, a miniature view of an 8½-by-11-inch page. MacPaint 2.0 has no Show Page view, but you can still center a drawing by eye. First, select Zoom Out (⌘-L) to view your drawing at a 50 percent reduction. Then, select the entire image by pressing ⌘-Shift while double-clicking the marquee (this shrinks the marquee around the selected area). Finally, drag the selected area in the 50 percent view until it's centered on the page.



#### Pick a Pattern

With the Edit Pattern box open, you can click the pointer anywhere on a drawing to pick up patterns.

#### MIXING FONTS AND STYLES

Although MacPaint 2.0 improves upon its predecessor's text-handling skills by letting you adjust line spacing, text is still not the program's strong suit. However, a few tricks will help you get the most out of MacPaint's text. For example, you can mix fonts, styles, and sizes in a single block of text with the help of the Enter key. Type along until you need to change a text attribute. Press Enter, then select a new font, size, or style (or any combination thereof) and continue typing. You can make as many changes as you wish until you press the mouse button—or until your aesthetic sensibilities prevail, whichever comes first. As soon as you press the mouse button, all your stylistic changes are set in stone (well, set in pixels anyway); the characters become a bitmapped image rather than editable text.

#### PASTING TEXT

When text is pasted into a MacPaint document, it appears as 12-point Geneva, surrounded by a marquee. You can change the shape of the marquee if, immediately after pasting in the text, you hold down

the ⌘ key and drag the lower-right corner of the marquee. You can also set the font, size, and style of the text selection if you do so immediately—before clicking the mouse button.

#### HIGH-QUALITY TEXT (WITH A LITTLE HELP)

Because MacPaint is a bitmapped graphics program, its text looks good only if you have the proper screen font sizes installed. System 7.0's outline fonts should take care of that problem, but in the meantime you can breathe new life into MacPaint text with Adobe Type Manager (ATM). Adobe's handy utility is installed as a CDEV and works behind the scenes, automatically displaying crisp, readable text at virtually any size (see "Before and After ATM"). Innovations such as System 7.0 and ATM improve the appearance of bitmapped text so much that paint programs may soon experience a renaissance.

#### AS IT IS CUT, SO SHALL IT BE PASTED

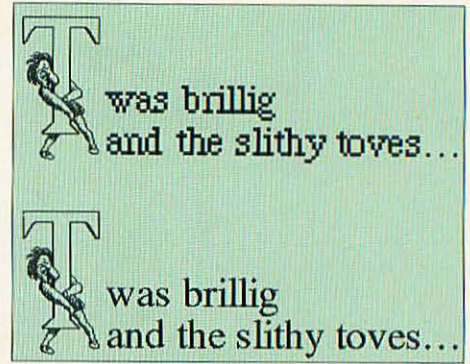
Have you ever cut or copied an image and pasted it into another drawing, only to find an annoying border of white space around the pasted selection? If so, you should select the image with the lasso, rather than the marquee, before cutting or copying it. Unlike the marquee, the lasso shrinks to fit around the boundaries of an image. In MacPaint 2.0, if you hold down the ⌘ key while selecting with the marquee, when you release the mouse button the rectangle shrinks to fit the image it surrounds.

#### MARKING THE MARQUEE

To see the outline of the marquee while dragging a selection, hold down the space bar as you drag.

#### REDUCING WITH A TOUCH OF GRAY

If you hold down the ⌘ and Shift keys while shrinking a selection, the image retains its vertical and horizontal proportions. You can also use MacPaint 2.0's Scale Selection command to reduce a selected area by a specified percentage of its original size. Unfortunately, if you shrink an intricate drawing to, say, a quarter of its original size, it often becomes a black and blurry blob. You can



#### Before and After ATM

Adobe Type Manager is a shot in the arm for bitmapped graphics programs like MacPaint. Compare QuickDraw's attempt to produce 36-point text (with no screen font of that size installed) and ATM's rendition.

improve the appearance of a reduced image by dyeing it gray before you shrink it, thus reducing the number of pixels that are crammed into the reduced space. To enhance a reduced image, perform the following steps:

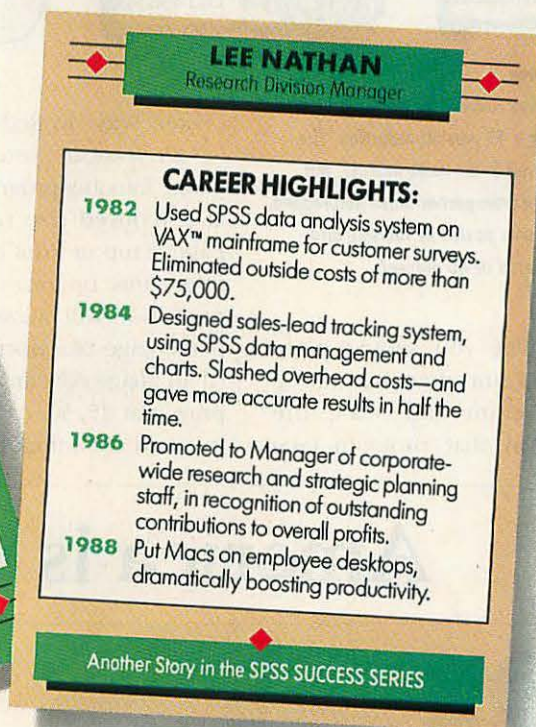
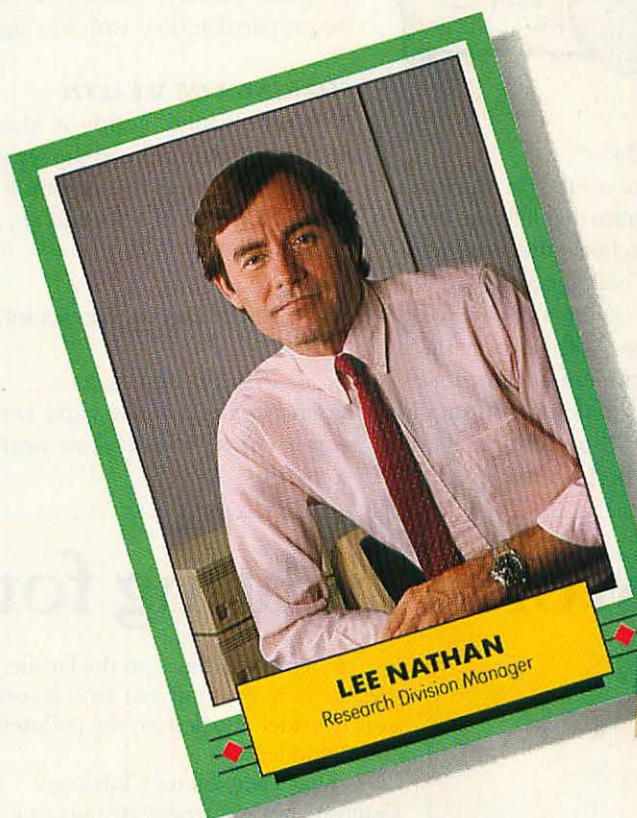
1. Surround the full-size image with the marquee.
2. Select Invert from the Edit menu. (This reverses black and white pixels.)
3. From the tool palette, choose the filled rectangle tool. From the pattern palette, choose 50 percent gray (the gray on the top row). Check the Preferences dialog box and make sure the Transparency pattern effect is checked.
4. Hold down the ⌘ and Option keys to produce transparent paint, and draw a rectangle over the inverted drawing.
5. Surround the drawing with the marquee and Invert again to get a gray-tinted version of your original drawing.
6. Hold down the ⌘ and Shift keys and drag the marquee inward to shrink the drawing, or choose Scale Selection from the Goodies menu and type in a percentage. The scaled image won't be perfect, but it will have more detail than if you'd simply reduced the original.

#### SCALING ABROAD

Although the scaling technique just described does improve the appearance of a reduced MacPaint image, shrinking an image in MacPaint causes a loss of detail because pixels clump together. To  
(continues)



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### Three Ways to Reduce

The image on the left was reduced by choosing *Scale Selection* and specifying a 40 percent reduction. The middle image was reduced in the same manner, but was painted gray with a transparent wash beforehand. The image on the right was pasted at full size into *Microsoft Word* and printed at 40 percent.

get the best results, you should paste the full-size MacPaint drawing into a page-layout program and scale the image from within that program (see

"Three Ways to Reduce").

Or you can paste a full-size MacPaint image into any program that lets you print at a reduced size (check the program's Page Setup or Print dialog box to see if it offers this option). Even a lowly word processor will allow you to print at a percentage of a document's original size. (If an image contains patterns, you should print it at 25, 50, or 75 percent reduction to avoid distorting the patterns.)

### SERVICE BUREAU PRINTING

If you check the Smoothing option in MacPaint's Page Setup dialog box and print a drawing on a 300-dpi laser printer, you'll be impressed at how this option smooths the notorious jaggies. Unfortunately, this option doesn't work when you print bitmapped graphics on a high-resolution imagesetter such as a Linotronic 300. If you plan to print graphics at 1200 or 2500 dpi, either use another type of drawing program (object-oriented or PostScript) or be prepared to live with the jaggies.

### SHARING THE WEALTH

If you've found a tip or shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips*, *Macworld*, 501 Second St., San Francisco, CA 94107. ■

See *Where to Buy* for contact information.

*Erfert Fenton is a Macworld contributing editor whose beat is fonts and graphics software.*

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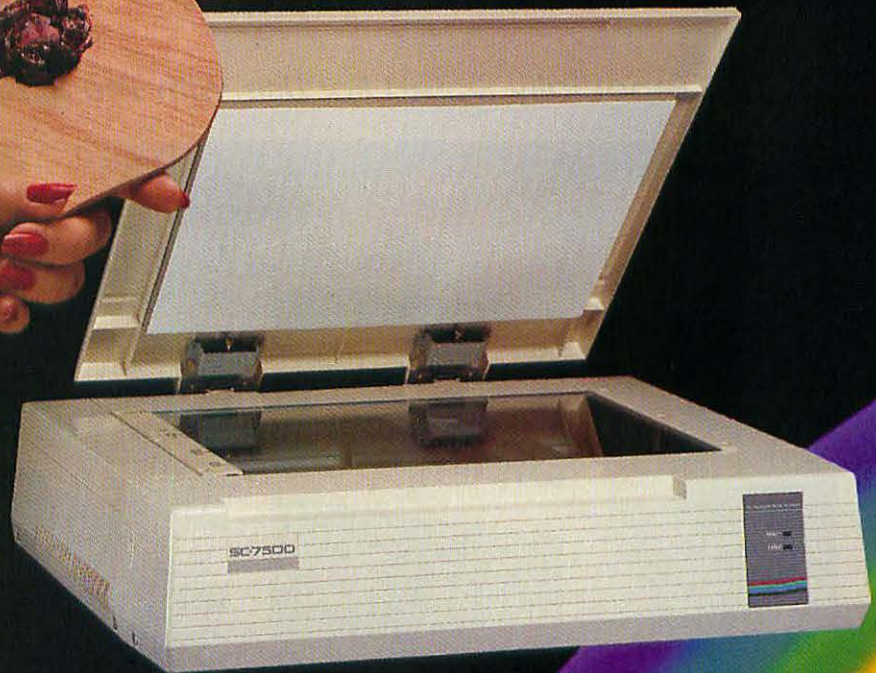
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# UPDATES

*This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.*

**Construction Set** version 2.0 allows you to create an unlimited number of parts such as buttons and LEDs. "Paper-tape" graphic can hold up to 32K; includes financial functions, bit operation functions, and functions that affect the calculator itself. Dubl-Click, 9316 Deering Ave., Chatsworth, CA 91311; 818/700-9525. \$25; \$89.95 new.

**Excelerate for Microsoft Excel** 2.2 adds two new modules (making a total of nine): What's New for 2.2 and Macros for 2.2. Macros for 2.2 covers the new macro features in Excel 2.2; What's New for 2.2 covers other features such as creating borders, using multiple fonts, assigning colors, adding notes to cells, protecting and auditing spreadsheets, using data forms, and using internal and external macros. Personal Training Systems, 828 S. Bascom, #100, San Jose, CA 95128; 408/559-8635. \$25 per module; \$49.95 per module new.

**Gofer** version 2.0 searches any Mac hard disk or file server and supports a variety of additional programs, such as FullWrite, MacWrite I, Microsoft Word 4.0, and Microsoft Works 1 and 2. Includes wild-card function; has search-set feature for locating hard-to-find information, and for retrieval of lost data using a minimal amount of information. Includes a function for loading the file into any desktop application. Microlytics, One Tobey Village Office Park, Pittsford, NY 14534; 716/248-9150. \$25; \$79.95 new.

**Hard Disk Partition** version 3.0 adds expandable partitions, on-the-fly encryption, and multiuser access control. FWB Software, 2040 Polk St., #215, San Francisco, CA 94109; 415/474-8055. \$30; \$79.95 new.

**HyperDA** version 1.2 lets users modify existing text fields, acts as an interactive HyperCard stack, and lets users designate a default stack to open automatically when HyperDA is accessed. Symmetry Corporation, 761 E. University, Mesa, AZ 85203; 800/624-2485. \$15; \$89 new.

**MacAtlas** version 2.0 contains a complete set of MacPaint-format maps including a world map, 16 regional maps, maps of the United States by state, and all 50 states by county. MicroMaps Software, Box 757, Lambertville, NJ 08530; 800/334-4291. \$79.

**MacinStor Installer** version 2.01 automatically reallocates bad blocks; has SCSI partitioning, password protected-partitioning, full A/UX support, manual mounting or automounting of partitions, and read-only partitioning. Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300. \$25; bundled with hardware.

**Macintosh Pascal** version 3.0 runs on all Mac models and is compatible with MultiFinder. Allows printing of program's output to a networked printer and launching the program from a server. Includes simplified installation. Symantec, 10201 Torre Ave., Cupertino, CA 95014-2132; 408/253-9600. \$49 for educational users; \$69 for noneducational users; \$125 new.

(continues)



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**MacSmarts Professional** version 3.0 and MacSmarts version 3.3 are compatible with SuperCard. MacSmarts Professional version 3.0 can handle up to 4000 rules per knowledge base and 1000 examples per rule for creating expert systems. Includes a report generator for expanded text, graphics advice, and session reporting. Cognition Technology, 55 Wheeler St., Cambridge, MA 02138; 617/492-0246. Professional version free to registered owners of MacSmarts Professional; \$100 to upgrade from MacSmarts; \$495 new. MacSmarts \$50; \$195 new.

**MapMaker** version 4.0 contains a tool palette with object-oriented color drawing tools for lines, arrows, rectangles, ovals, and editable polygons. Also includes interactive functions for gauging distance and latitude/longitude, draws map sizes of up to 10 by 10 pages, and allows placement of map boundaries into individual layers that can be displayed or selectively hidden. Includes PostScript hairline line widths, and has expanded import/export capabilities for graphics and data. Select Micro Systems, 322 Underhill Ave., Yorktown Heights, NY 10598; 914/245-4670. \$75 if originally purchased before July 1, 1989; free if purchased after that date; \$395 new.

**Mathematica** version 1.2 supports linear programming, differential equations, statistics, and concurrent processing. Also has a feature to select interactive 3-D viewpoint and supports Adobe Illustrator format. Wolfram Research, P.O. Box 6059, Champaign, IL, 61821; 217/398-0747. \$45; \$495 new.


**Minimum Requirements** version 2.0 records financial transactions, generates reports, produces invoices, and tracks fixed assets. Includes cash-requirements scheduling feature. Spreadware, P.O. Box 4574,

Hayward, CA 94540-4574; 415/794-4388. \$7.95; \$59 new.

**PrintBar** version 2.0 adds three volumes. Volume 1 includes Code 39; Volume 2 contains UPCA, UPCE and EAN; Volume 3 is interleaved 2 of 5. Supports linotronic, LaserWriter, and ImageWriter printers. Bear Rock Software, 6069 Enterprise Dr., Placerville, CA 95667; 916/622-4640. \$195 to upgrade to current version; \$49 to upgrade to version 1.2; \$225 per volume; \$495 new (three-volume set).

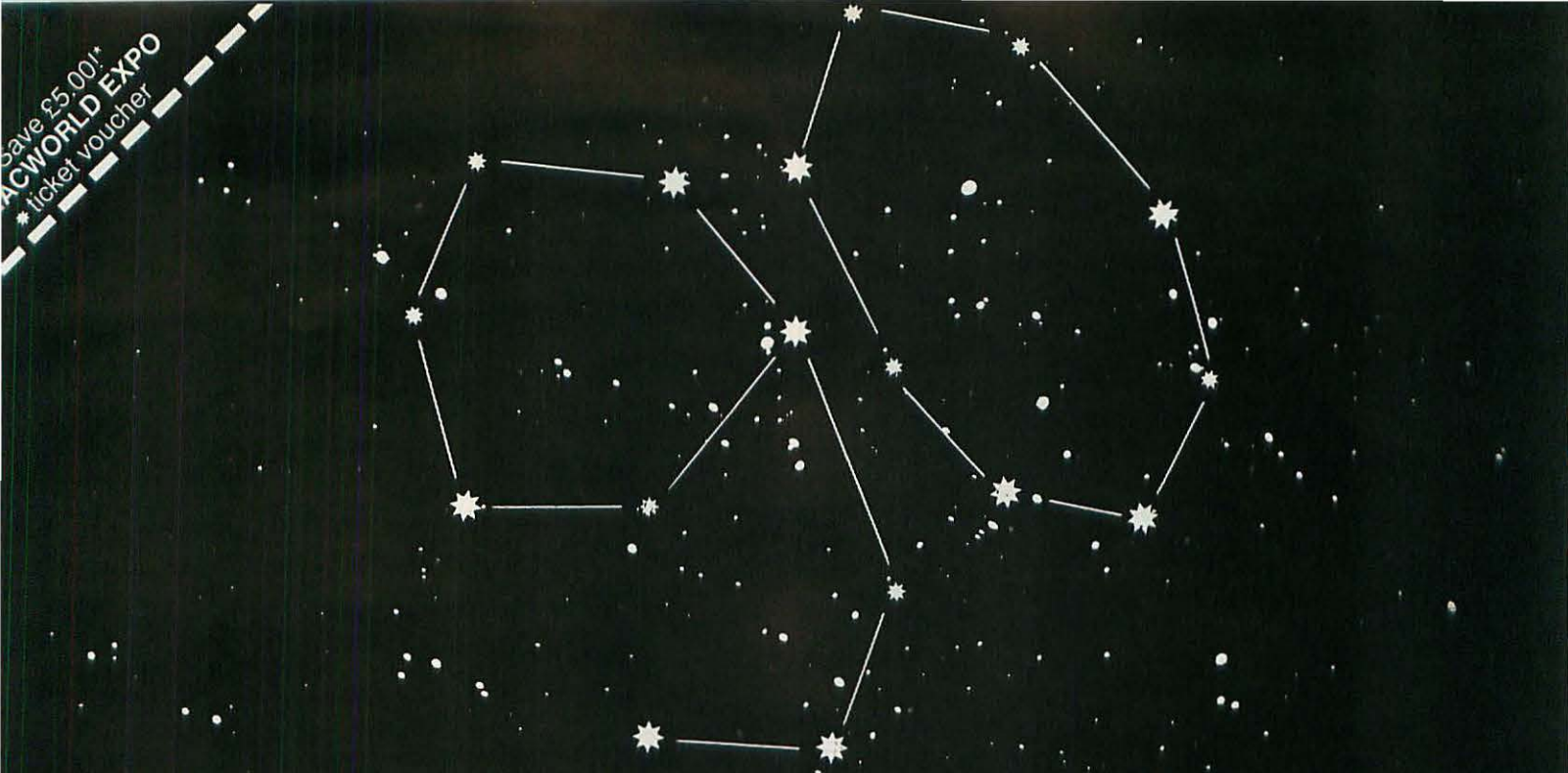
**Sequencer 1000** version 3.0 HyperCard stack for creating HyperCard Play scripts using digitized sounds and music. This version lets you choose from a variety of instruments and sounds; change tempos and pitches and save them for playback; and compose on the computer using a screen image of a keyboard. Silver Yucca Software, 3419 East 7590 South, Salt Lake City, UT 84121; 801/943-4428. \$24.95 new.

**Smalltalk/V** version 1.1 extends user primitive support to include a facility for returning an error code immediately upon failure, and increases the speed of the interpreter by 15 percent. Digitalk, 9841 Airport Blvd., Los Angeles, CA 90045; 213/645-1082. \$25 plus \$5 s/h; \$199.95 new.

**SuperMOM** version 2.1 has increased number of inventory-reporting and drop-ship features. National TelePress, P.O. Box 79, Mendocino, CA 95460; 800/448-0988 outside California; 707/937-2848 inside California. Free; \$795 new. 

*To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, 501 Second St., San Francisco, CA 94107.*





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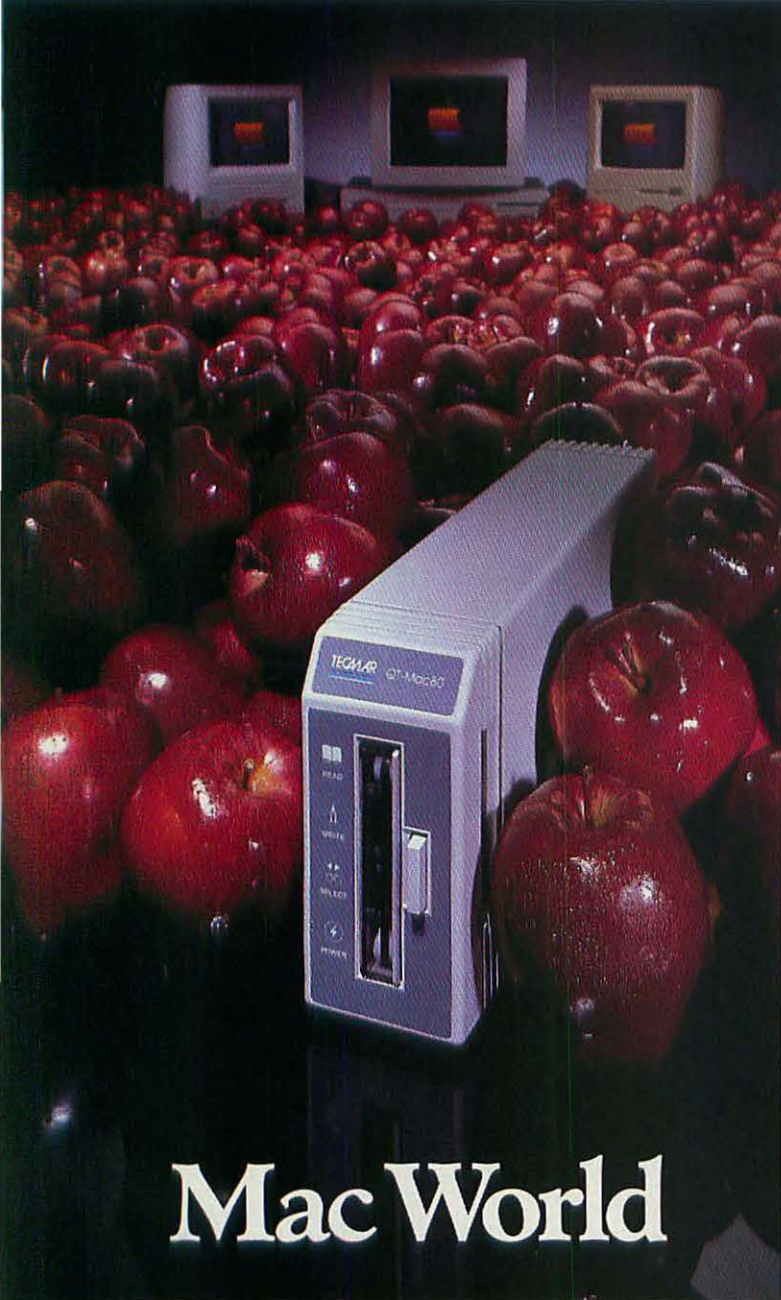
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*This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to reader service card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.*

## Reader Service

- 701 1stAid Kit** 1stAid Software, Inc., 42 Radnor Rd., Boston, MA 02135; 617/782-4676, 800/843-3497.
- 702 lli cache (32K)** DayStar Digital, Inc., 5556 Atlanta Hwy., Flowery Branch, GA 30542; 404/967-2077, 800/962-2072.
- 703 4693 DX** Tektronix Inc., P.O. Box 1000, Mailstop 63-447, Wilsonville, OR 97070; 800/835-6100.

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- 704 Aask** CE Software Inc., P.O. Box 65580, West Des Moines, IA 50265; 515/224-1995, 800/523-7638.
- 705 Accelerator 25/030, Accelerator 33/030, Accelerator 40/030, Accelerator 50/030** DayStar Digital, Inc., 5556 Atlanta Hwy., Flowery Branch, GA 30542; 404/967-2077, 800/962-2072.

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- 711 Dove Computer Corp.**, 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.
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- 713 Irwin Products Group**, 2010 Commonwealth Blvd., Ann Arbor, MI 48105; 313/930-9000, 800/421-1879.
- 714 MacProducts USA**, 8303 MoPac Expwy., #218, Austin, TX 78759-8369; 512/343-9441, 800/622-3475.
- 715 Microtech International Inc.**, 158 Commerce St., East Haven, CT 06512; 203/468-6223, 800/626-4276.
- 716 Newbridge Microsystems**, 20 Edgewater St., Kanata, Ontario K2L 1V8; 613/836-1073, 800/267-7231.
- \* **Novy Systems, Inc.**, 1862 Fern Palm Dr., Edgewater, FL 32141; 904/427-2358.
- 717 Orchid Technology**, 45365 Northport Loop W, Fremont, CA 94538; 415/683-0373.
- 718 Radius, Inc.**, 1710 Fortune Dr., San Jose, CA 95131; 408/434-1010, 800/227-2795.
- 719 Siclone Sales & Engineering Corp.**, 1515 Centre Pointe Dr., Milpitas, CA 95035; 408/263-8207, 800/862-2636.
- 720 Spectra Micro Development**, P.O. Box 41795, Tucson, AZ 85717; 602/884-7402.
- 721 SuperMac Technology**, 485 Potrero Ave., Sunnyvale, CA 94086; 408/245-2202.
- 722 Total Systems**, 99 W. Tenth Ave., Eugene, OR 97401; 503/345-7395, 800/874-2288.
- 723 AccuText** Xerox Imaging Systems, 535 Oakmead Pkwy., Sunnyvale, CA 94086; 408/245-7900, 800/248-6550.
- 724 Adobe Type Manager** Adobe

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- 725 The Algebraic Proposer** True BASIC, Inc., 12 Commerce Ave., West Lebanon, NH 03784; 603/298-8517, 800/872-2742.
- 726 Blueprint** Graphsoft, 8370 Court Ave., Ellicott City, MD 21043; 301/461-9488.
- 727 Capture** Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; 818/991-6540.
- 728 CB3203** RGB Technology, Inc., 6862 Elm St., #210, McLean, VA 22101; 703/556-0667.
- 729 The Church Office** TLC Software, Box 232, Osseo, MN 55369; 612/424-5798.

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## C

- 730 Colorizer** Palomar Software, Inc., P.O. Box 120, Oceanside, CA 92054; 619/721-7000.
- 731 ColorQuick for the Macintosh** Tektronix, Inc., P.O. Box 1000, Mailstop 63-447, Wilsonville, OR 97070; 800/835-6100.
- 732 CPS** Lasergraphics, Inc., 20 Ada, Irvine, CA 92714; 714/660-9497, 714/727-2651.
- 733 Credit Card DA** E.E.S. Companies, 2 Vernon St., #404, Framingham, MA 01701; 508/653-6911.

## D

- 734 DAtabase** Preferred Publishers, Inc., 5100 Poplar Ave., #617, Memphis, TN 38137; 901/683-

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- 3383, 800/446-6393.
- 735 DiskExpress II** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.
- 736 DiskFit** SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086; 408/245-2202.
- 737 DiskTools Plus** Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404; 415/571-7171, 800/245-4525.
- 738 DiskTop** CE Software, Inc., P.O. Box 65580, West Des Moines, IA 50265; 515/224-1995, 800/523-7638.
- 739 DOS Mounter** Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203.

## E

- \* **Enhance** MicroFrontier, 7650 Hickman Rd., Des Moines, IA 50322; 515/270-8109, 800/388-8109.
- 740 EPL-8018 NA7, EPL-8028 NA8R** Panasonic Communications & Systems Co., 2 Panasonic Way, Secaucus, NJ 07094; 201/392-4603.
- 742 Exposure** Preferred Publishers, Inc., 5100 Poplar Ave., #617, Memphis, TN 38137; 901/683-3383, 800/446-6393.

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- 743 Fastback II** Fifth Generation Systems, Inc., 10049 N. Reiger Rd., Baton Rouge, LA 70809; 504/291-7221, 800/225-2775.
- 744 Fast Forms** Powerup Software Corp., 2929 Campus Dr., San Mateo, CA 94403; 415/345-

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## Learn from the MacMaestros

The first two days of MACWORLD Expo begin with keynote presentations that are guaranteed to make your spirits soar. The industry's best will dazzle you with the newest Macintosh developments and trends; you'll get the latest scoop straight from the Mac insiders.

And then you'll have to make some tough choices, because MACWORLD Expo/San Francisco's Conference Program is bigger and better than ever! The hottest topics will be covered in over 60 sessions presented in a concentrated, two-day format. Eight different mini-conferences are scheduled for Wednesday and Thursday (April 11th and 12th).

**1. The Multimedia Mac** (New!) — Sessions to bring you up to date on the exciting integration of video, sound and animation on the computer platform.

**2. Designer Solutions** (New!) — At last! Intensive sessions to maximize the usefulness of Macintosh in design applications — for architects, graphic artists, engineers and more.

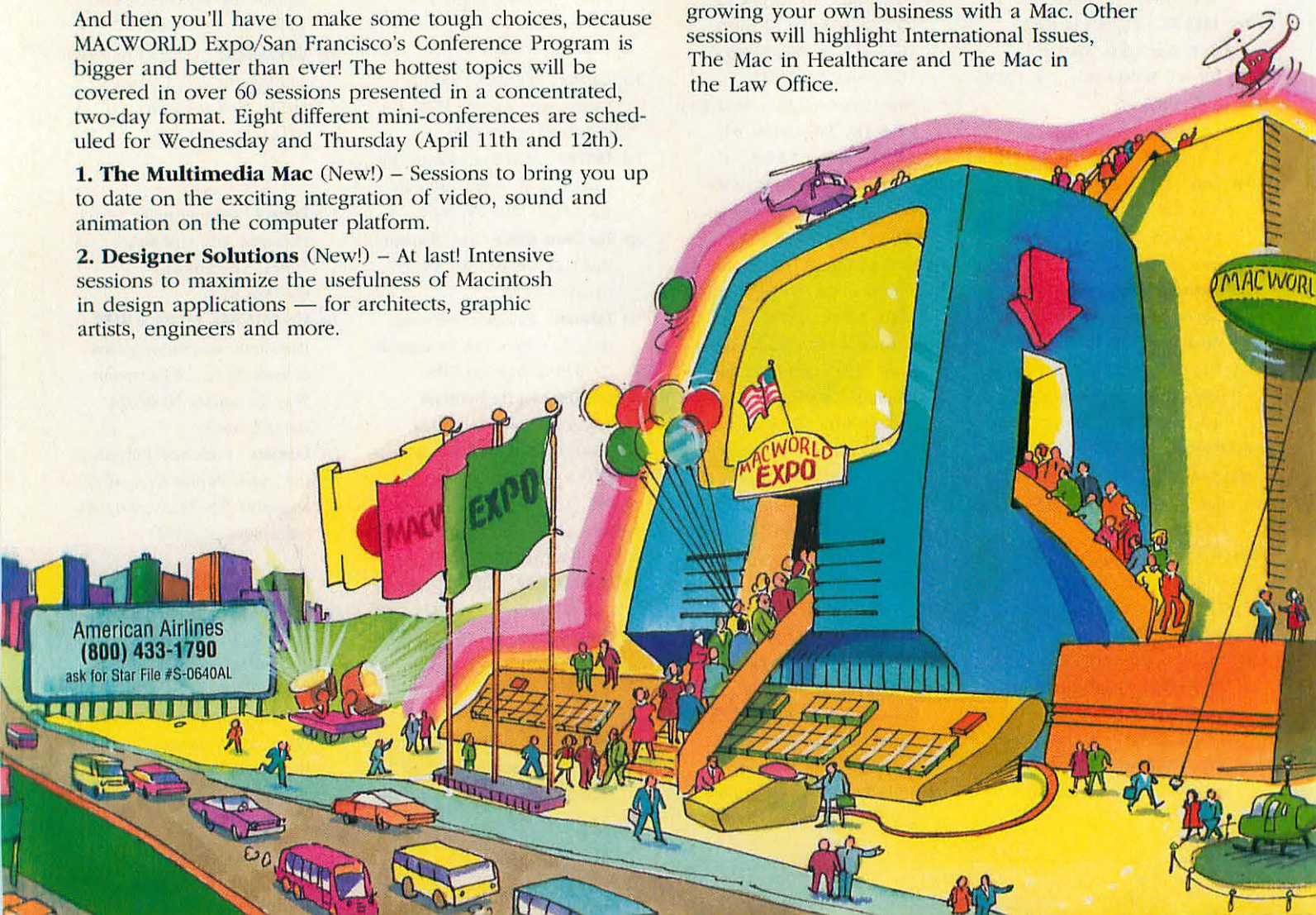
**3. Software Review Sessions** (New!) — Authoritative, unbiased overviews of the best-selling Macintosh software packages, presented by software review editors from the leading Mac publications.

**4. User Workshops** — Introductory: for those just getting started with the Mac, or for those who need a quick lesson on the most popular Mac applications. Advanced: where experienced users share their ideas and expertise and reveal insider tricks.

**5. The Mac in Business** — No-nonsense pointers to help solve the unique problems of business users, along with discussions on the possible impact of developing trends and technologies in the Mac marketplace.

**6. Programmer/Developer Forums** — The place for veteran and novice techies to brainstorm and learn about innovative advances and techniques.

**7. Special Interest Group Meetings** — Sessions to serve the needs of users who are seeking to prosper and profit from the Mac in an amazingly broad range of settings. Includes: Education Workshops — A golden opportunity for teachers and administrators to learn how colleagues are using the Mac. How-To's for the Home Office/Small Business — Resources and recommendations especially useful to the Macintosh home office worker, along with tips on growing your own business with a Mac. Other sessions will highlight International Issues, The Mac in Healthcare and The Mac in the Law Office.





# MACWORLD EXPOSITION<sup>®</sup>

San Francisco, April 11, 12 and 13

**Register for MACWORLD Expo/San Francisco  
by March 5 and save \$15 on the full  
Conference Program and Exhibit Package,  
or \$10 on Exhibits only admission.**

This is your chance to preregister for MACWORLD Expo/San Francisco, April 11-13, 1990, at Moscone Center, Brooks Hall and Civic Auditorium. Please choose your package and fill out this form completely. Incomplete forms will be returned. **Use one form per person.** (Make photocopies to register additional people.) Then send the completed form(s) along with payment to: MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026.

## Special Instructions for Non-U.S. Attendees

If you're preregistering from outside the U.S. and would prefer to have your badge sent to you instead of picking it up at Moscone Center, be sure to check the appropriate box on the registration form and add an additional \$35 to your preregistration cost. We will Federal Express your badge to you. Please fill in the exact street address and be sure to include your telephone number. Do not use a Post Office Box.

Registration coupons must be returned by March 5; coupons received after March 5 will be returned. Registration fees are non-refundable. For further information, call the MACWORLD Expo Hotline at (617) 361-3941. U.S. attendees will be mailed their badges on or about March 20. (Be sure to check box indicating where badge should be sent.) All other badges will be held at the Preregistration Counter at Moscone Center for pick up beginning Tuesday, April 10.

\*All Conference Sessions are subject to change without notice. Admission is on a first-come, first-served basis, with no guaranteed seating or reservations. Please complete the registration form on the reverse side and send it, along with your check or money order to: MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026



Expo Hotline  
(617) 361-3941



# MACWORLD Expo Registration Card

San Francisco April 11, 12 and 13

Please register me for:

☐ **Package One \$65**

Conference Sessions and Exhibits\*  
Preregister by March 5  
(\$80 at the door)

☐ **Package Two \$15**

Admission to Exhibits only  
Preregister by March 5  
(\$25 at the door)

☐ I am a Non-U.S. attendee  
and would like my badge  
shipped by Federal Express.  
I have enclosed an  
additional \$35.00.

Please send my badge and further information to:

Check one: ☐ Home Address ☐ Company Address

Last Name 



 First Name

Mailing Address

City, State, Zip

Telephone

If mailing to company address:

Title

Company

☐ Check enclosed (make payable to MACWORLD Exposition) Amount \$ \_\_\_\_\_

☐ MasterCard ☐ Visa ☐ American Express Amount \$ \_\_\_\_\_

Account Number 



 Expiration Date

(Include all numbers)

Cardholder Signature \_\_\_\_\_

(Signature necessary to be valid)

If cardholder is other than registrant, please print name below:

Last Name 



 First Name

**CASH ONLY AT THE DOOR. After March 5, you must register at the show.**

Please check the appropriate boxes:

Your industry or profession

- a. ☐ Manufacturer (non-computer)
- b. ☐ Manufacturer (computer industry)
- c. ☐ Distributor/dealer/retailer/service
- d. ☐ Finance/insurance/real estate
- e. ☐ Business services
- f. ☐ Professional (law/medicine)
- g. ☐ Health services
- h. ☐ Communications/publishing
- i. ☐ Education
- j. ☐ Government
- k. ☐ Consultant
- l. ☐ Other (specify) \_\_\_\_\_

Your title

- m. ☐ CEO/president/vice president
- n. ☐ Comptroller/treasurer/accountant
- o. ☐ DP/MIS manager
- p. ☐ Owner/partner
- q. ☐ Engineer
- r. ☐ Doctor/lawyer/dentist
- s. ☐ Educator
- t. ☐ Art director/writer/editor
- u. ☐ Consultant
- v. ☐ Marketing
- w. ☐ Sales
- x. ☐ Other (specify) \_\_\_\_\_

Size of your organization

- (number of employees national/international)
- y. ☐ Under 50
  - z. ☐ 50-99
  - aa. ☐ 100-499
  - bb. ☐ 500-999
  - cc. ☐ 1,000-5,000
  - dd. ☐ Over 5,000

Which personal computer(s) do you own/or use?

- ee. ☐ Macintosh
- ff. ☐ Macintosh Plus
- gg. ☐ Macintosh SE
- hh. ☐ Macintosh II
- ii. ☐ Apple II Series
- jj. ☐ IBM PC (or compatible)
- kk. ☐ None
- ll. ☐ Other (specify) \_\_\_\_\_

\*All conference sessions are on a first-come, first-served basis with no guaranteed seating. Please fill out this form completely and send it, along with your check or money order to:  
MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026.



**8. Late-Breaking/Popular Demand Topics** – To keep the MACWORLD Expo conference program (and you!) up-to-the-minute, we'll top off the agenda with sessions reflecting the latest market developments — and special requests. Included will be the popular MACWORLD Expo User Group (MUSE), where user group members from all over the country exchange information, ideas and strategies, and get good answers to tough questions.

## Discover a "Treasury of Practical Tips"

Even after two conference days packed with MacFacts, there's still more to learn! We've sifted through all the best powerhouse ideas and pointers, and sorted them into a series of all new two-hour sessions called the MACWORLD Expo Treasury of Practical Tips. These hard-hitting, practical how-to sessions cover the programs and products most requested by MACWORLD Expo attendees, and is a one day only event! The limited edition Treasuries will be offered only on Friday, April 13.

## Register NOW and Save \$\$\$

Register now to save money and enjoy all the benefits of attending MACWORLD Expo. You can save \$15 on a full registration, including all Conference Sessions and Exhibits, by registering before March 5. (\$65 in advance, \$80 at the door.) Or, you can save \$10 if you register for Exhibits Only. (\$15 in advance, \$25 at the door.)

In either case, preregistration saves you money and time. When you register in advance, we'll send you your admission badge early so you'll be able to walk right into MACWORLD Expo! You'll avoid long lines at the door.

To register for MACWORLD Expo, simply complete the attached form and send it in with your payment (by check or credit card.) Or, for more information, call the MACWORLD Expo Hotline at **(617) 361-3941**.

Your advanced registration must be received by March 5, 1990. Registrations received after March 5 will be returned.

On-site registration is cash only. Please note: All conference sessions are subject to change without notice.

Admission is on a first-come, first-served basis, with no guaranteed seating or reservations.

## Save Money on Airfare and Hotels



American Airlines is the official airline of MACWORLD Expo, and you can save up to **45%** if you fly to San Francisco on American. To take advantage of the MACWORLD Expo discount, just call American at **(800) 433-1790** and ask for Star File number **S-0640AL**. You'll automatically receive your discount.

**Hotels** in the San Francisco area are also offering MACWORLD Expo discounts. To receive the preferred rates, simply call one of the hotels listed below and mention that you are going to MACWORLD Expo. There are a limited number of rooms available at preferred rates, so make your plans early! Published rates are single and double rooms respectively and are starting rates:

HOTEL	RATE	PHONE*	HOTEL	RATE	PHONE*
Fairmont Hotel	\$125/\$155	772-5000	Huntington Hotel	\$145/\$145	474-5400
Four Seasons	\$155/\$155	775-4700	on Nob Hill		
Grand Hyatt	\$149/\$149	398-1234	Hyatt Regency	\$135/\$160	788-1234
Union Sq.			Le Meridien	\$135/\$155	974-6400
Hilton	\$110/\$120	771-1400	Marriott	\$150/\$170	896-1600
Holiday Inn	\$89/\$89	441-4000	Parc Fifty Five	\$127/\$127	392-8000
Golden Gateway			The Portman	\$160/\$180	771-8600
Holiday Inn	\$117/\$137	398-8900	Sir Francis Drake	\$115/\$125	392-7755
Union Square			The Westin	\$115/\$130	397-7000
Hotel Nikko	\$135/\$150	394-1111	St. Francis		

\*The area code for San Francisco is (415).

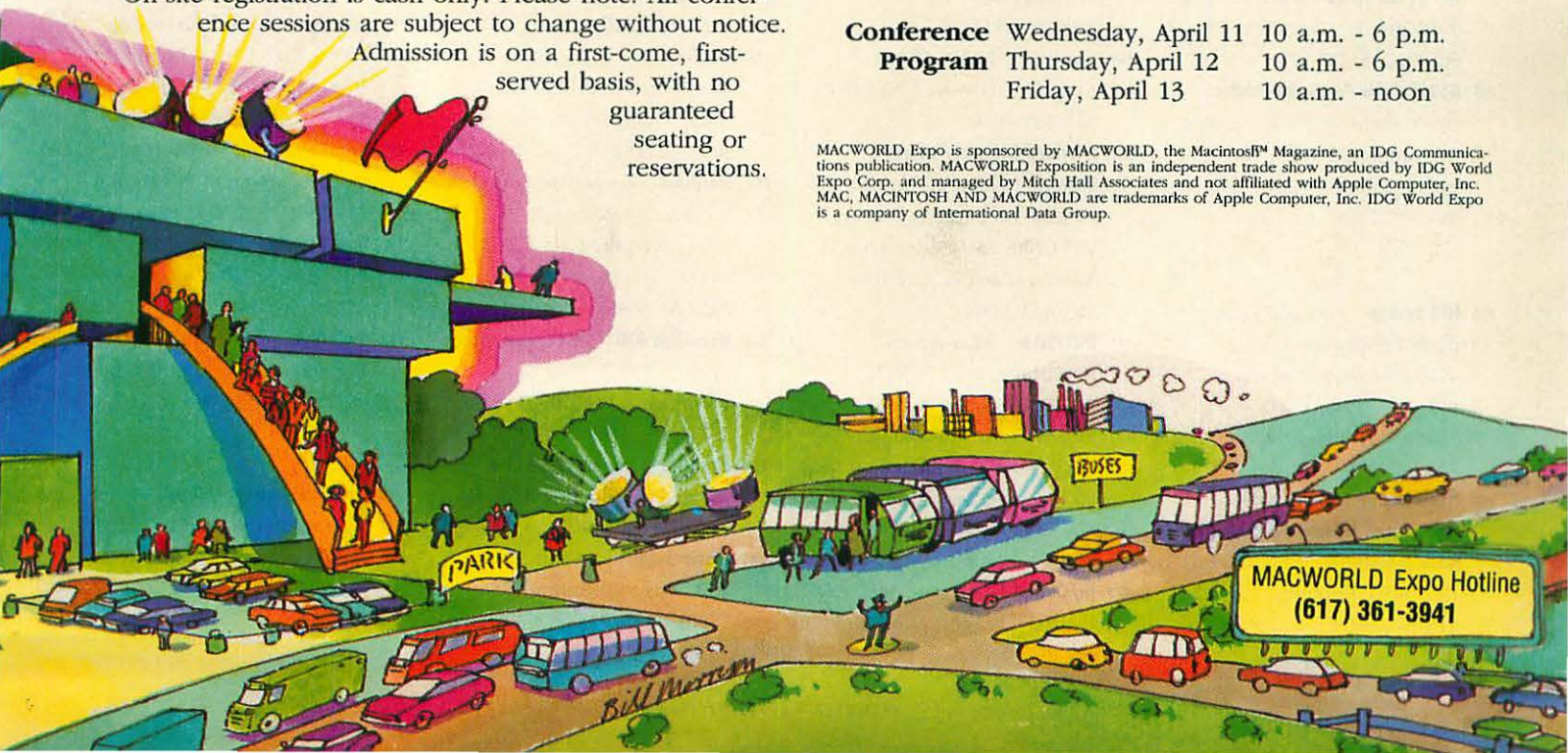
MACWORLD Expo's three San Francisco locations are Moscone Center, Brooks Hall and Civic Auditorium. MACWORLD Expo Express Buses conveniently connect you with all three locations; just look for the "Expo Express" and hop on!

The MACWORLD Expo/San Francisco show hours are:

**Exhibits** Wednesday, April 11 10 a.m. - 6 p.m.  
Thursday, April 12 10 a.m. - 6 p.m.  
Friday, April 13 10 a.m. - 3 p.m.

**Conference Program** Wednesday, April 11 10 a.m. - 6 p.m.  
Thursday, April 12 10 a.m. - 6 p.m.  
Friday, April 13 10 a.m. - noon

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Reader Service

- 5900, 800/851-2917.
- 745 FasTrack** Computer System Associates, 7564 Trade St., San Diego, CA 92121; 619/566-3911.
- 746 FAXstf** STF Technologies, Inc., P.O. Box 81, Jct. I-70 and Hwy. 23, Concordia, MO 64020; 816/584-7727, 800/426-1679.
- 747 Findswell** Working Software, Inc., P.O. Box 1844, Santa Cruz, CA 95061-1844; 408/423-5696, 800/331-4321.
- 748 FP-510 Full Color Printer** Canon USA, Inc., 1 Canon Plaza, Lake Success, NY 11042-1113; 516/488-6700.
- 749 Freedom of Press** Custom Applications, Inc., Bldg. 8, 900 Technology Park Dr., Billerica, MA 01821; 508/667-8585, 800/873-4367.
- 750 FX882-25, FX882-33** Computer System Associates, 7564 Trade St., San Diego, CA 92121; 619/566-3911.

G

- 752 Gofer** Microlytics, Inc., 1 Tobey Village Office Park, Pittsford, NY 14535; 716/248-9150, 800/828-6293.
- 753 G370-10U, G330-70U** Mitsubishi Electronics America, Inc., 991 Knox St., Torrance, CA 90502; 213/217-5732.
- 755 G5232 Color PostScript Printer** Oce Graphics, 385 Ravendale Dr., Mountain View, CA 94039; 415/964-7900, 800/537-7568.

H

- 756 HFS Backup** Personal Computer Peripherals Corp., 4710 Eisenhower Blvd., Bldg. A4, Tampa, FL 33634; 813/884-3092, 800/622-2888.
- 757 Hummingbird 33 MHz math coprocessor, Hummingbird 36 MHz math coprocessor** Shodan, P.O. Box 4456, Berkeley, CA 94704; 415/849-9479.

Reader Service

- 759 Icon-It** Tactic Software, 11925 S.W. 128th St., Miami, FL 33186; 305/378-4110, 800/344-4818.

IMAGESETTERS

- 760 Autologic, Inc.**, 1050 Rancho Conejo Blvd., Thousand Oaks, CA 91320; 805/498-9611.
- 761 Agfa Compugraphic**, 200 Ballardvale St., Wilmington, MA 01887; 508/658-5600, 800/822-5524.
- 762 Birmy Graphics Corp.**, 2244 N.W. 21st Terr., Miami, FL 33142; 305/633-3321, 800/262-4769.
- 763 Hyphen, Inc.**, 187 Ballardvale St., Wilmington, MA 01887; 509/988-0880.
- 764 Itek Graphix**, Composition Systems Division, 34 Cellu Dr., Nashua, NH 03063; 603/889-1400, 800/444-0877.
- 765 Linotype Company**, 325 Oser Ave., Hauppauge, NY 11788; 516/434-2000, 800/633-1900, 800/832-5288 in NY.
- 766 Monotype, Inc.**, 2500 Brickvale Dr., Elk Grove Village, IL 60007; 312/350-5600.
- 767 Optronics**, an Intergraph Division, 7 Stuart Rd., Chelmsford, MA 01824; 508/256-4511.
- 768 Varsity**, 11 Mt. Pleasant Ave., East Hanover, NJ 94545; 201/887-8000.
- 769 Informed Designer, Informed Manager** Shana Corp., Advanced Technology Center, 9650 20th Ave., Edmonton, Alberta, Canada T6N 161; 403/463-3330.
- 771 INITPicker** Microseeds Publishing, Inc., 7030-B W. Hillsborough Ave., Tampa, FL 33634; 813/882-8635.
- 772 Inix** Natural Intelligence, Inc., 86 Richdale Ave., Cambridge, MA 02140; 617/266-7858, 800/999-4649.
- 773 In/Out** CE Software, Inc., P.O. Box 65580, West Des Moines,

Reader Service

- IA 50265; 515/224-1995, 800/523-7638.
- 774 JX-730** Sharp Electronics Corp., System Div., Box C, Mahwah, NJ 07430; 201/529-9500, 800/237-4277.
- 776 KidsMath** Great Wave Software, 5353 Scotts Valley Dr., Scotts Valley, CA 95066; 408/438-1990.
- 777 Language Master** Franklin Software, 3511 N.E. 22nd Ave., Fort Lauderdale, FL 33308; 305/566-3511, 800/323-0023.
- 778 LapLink Mac** Traveling Software, Inc., 18702 N. Creek Pkwy., Bothell, WA 98011; 206/483-8088, 800/662-2652.
- 779 MacLink Plus/PC** DataViz, Inc., 35 Corporate Dr., Trumbull, CT 06611; 203/268-0030.
- MacPaint** Claris Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052; 900/544-9554.
- 780 Mac-101** Datadesk International, Inc., 7651 Haskell Ave., Van Nuys, CA 91406; 818/780-1673, 800/826-5398.
- 781 MacPro** key tronic, P.O. Box 14687, Spokane, WA 99214-0687; 509/927-5515, 800/262-6006.
- 782 MacProof** Lexpertise Linguistic Software, 9 Exchange Pl., #900, Salt Lake City, UT 84111; 801/350-9100, 800/354-5656.
- 783 Marathon 030** Dove Computer Corp., 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.
- 784 MarkUp** Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; 818/991-6540.
- 785 MasterJuggler** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.

Reader Service

- 786 Math Rabbit** The Learning Company, 6493 Kaiser Dr., Fremont, CA 94555; 415/792-2101, 800/852-2255.
- MEMORY UPGRADES**
- 787 Clearpoint Research Corp.**, 35 Parkwood Dr., Hopkinton, MA 01748; 508/435-2000, 800/253-2778.
- 788 Computer Care, Inc.**, 420 N. Fifth St., #118, Minneapolis, MN 55401; 612/371-0061, 800/950-2273.
- 789 Digi-Graphics**, 764 E. Village Way, Kaysville, UT 84037; 801/544-2009.
- 790 Dove Computer Corp.**, 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.
- 791 Julian Systems, Inc.**, 220 Bates Ave., Ste. J, Concord, CA 94520; 415/686-4400.
- 792 Mac Doctor Electronics, Inc.**, 1145 Terra Bella Ave., Mountain View, CA 94043; 800/822-5524.
- 793 MacProducts USA**, 8303 MoPac Expwy., #218, Austin, TX 78759-8369; 512/343-9441, 800/622-3475.
- 794 Pinnacle Sales International**, 2005 Hamilton Ave., #220, San Jose, CA 95125; 408/559-8544, 800/622-1722.
- 795 Siclone Sales & Engineering Corp.**, 1515 Centre Pointe Dr., Milpitas, CA 95035; 408/263-8207, 800/862-2636.
- 796 Total Systems**, 99 W. Tenth Ave., Eugene, OR 97401; 503/345-7395, 800/874-2288.
- 797 MenuFonts 2** Beyond, Inc., P.O. Box 31990, Tucson, AZ 85751; 602/290-9790.
- 798 MultiDisk** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.
- 799 Norton Macintosh Utilities** Peter Norton Computing, Inc., 100 Wilshire Blvd., Santa Monica, CA 90403; 213/453-2361,

N

(continues)



## Purpose

The Andrew Fluegelman Award is given annually to encourage personal computer software excellence and to recognize a software programmer or team of programmers. We are looking for people who have made a substantial, innovative contribution to the personal computer community in commercial, shareware, or public-domain software.

The award was established in 1986 by PCW Communications to commemorate Fluegelman's contributions to the software field. Fluegelman developed PC-Talk, the first easy-to-use and powerful communications program for the IBM PC. His concept of freeware remains one of the most innovative means of sharing and marketing software. Fluegelman died in July 1985, and a fund was established in his name. The annual award, sponsored by PCW Communications and the Software Publishers Association, is made possible through the Andrew Fluegelman Fund.

## Eligibility

Any commercial, shareware, or public-domain personal computer software—including utilities, applications, and languages—developed by an individual or a team is eligible. The program must have been released between January 1, 1986, and December 31, 1989. Nominations can be submitted by anyone who did not participate in the software's development. Companies are encouraged to submit nominations for software that they market; but only individuals, not companies, are to be nominated.

# FOURTH ANNUAL

# ANDREW FLUEGELMAN

# AWARD 1990

## Judging

Each program will be evaluated according to the following criteria:

- \* It advances the state of the art of personal computing.
- \* It manifests innovation in concept and design.
- \* It demonstrates orientation to personal computer users.

## Program Copies

Finalists will be asked to submit six copies of their program for the judges' evaluation. These will be returned after judging. Please do not send programs until you are notified that you are a finalist.

## Selection of Winners

The award recipient is selected in a two-step procedure. First, an independent screening committee will review nominations and select the finalists.

Second, a panel of judges will evaluate the work of the finalists. From these, an award recipient will be selected.

## Prize

The award winner will receive \$5000 and a commemorative plaque. The award will be presented at the Software Publishers Association annual awards dinner in March 1990.

# CALL FOR NOMINATIONS

## Deadline

Nomination entries must be postmarked no later than February 15, 1990. Mail six completed copies of this nomination form to:

Andrew Fluegelman Award  
PCW Communications, Inc.

501 Second Street  
San Francisco, CA 94107

Attn: Amy Marks

For further information, call (415) 978-3180.

**1990 Andrew Fluegelman Award Nomination Form.** Please type your entries; no handwritten entries will be accepted. Attach additional pages with a brief description of the program (100 words or less) and the reason for your nomination.

Name of program: \_\_\_\_\_

Creator (if more than one, designate team leader): \_\_\_\_\_

Software marketer: \_\_\_\_\_ Release Date: \_\_\_\_\_

Nomination submitted by: \_\_\_\_\_

Company: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_



Reader Service

800/365-1010.



**800 OmniPage** Caere Corp., 100 Cooper Ct., Los Gatos, CA 95030; 408/395-7000, 800/535-7226.

**801 On Cue** ICOM Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

**802 Over 030** Computer System Associates, 7564 Trade St., San Diego, CA 92121; 619/566-3911.



**803 PaintJet, PaintJet XL** Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014; 800/752-0900.

**805 Panorama** ProVue Development Corp., 15180 Transistor Ln., Huntington Beach, CA 92649; 714/892-8199.

**806 Paper Keyboard** Datacap, 41 Prospect Dr., Yonkers, NY 10705; 914/423-7925.

**807 PC Tools Deluxe** Central Point Software, Inc., 15220 N.W. Greenbrier Pkwy., #200, Beaverton, OR 97006; 503/690-8090.

**808 Personal Golf Stats** Creative Computer Resources, 135 Verona Ave., Goleta, CA 93117; 805/968-7529.

**809 Personality** Preferred Publishers, Inc., 5100 Poplar Ave., #617, Memphis, TN 38137; 901/683-3383, 800/446-6393.

**810 Phaser CPS** Tektronix, Inc., P.O. Box 1000, Mailstop 63-447, Wilsonville, OR 97070; 800/835-6100.

**811 Pixelmaster** Howtek, Inc., 21 Park Ave., Hudson, NH 03051; 603/882-5200.

**812 PlotMaster** CalComp, Inc., 2411 W. La Palma Ave., Anaheim, CA 92801; 714/821-2000.

**813 Powermenus** Magic Software, Inc., 1602 Cascio Dr., Bellevue, NE 68005; 402/291-

Reader Service

0670, 800/342-6243.

**814 Pyro** Fifth Generation Systems, Inc., 10049 N. Reiger Rd., Baton Rouge, LA 70809; 504/291-7221, 800/225-2775.



**815 QD-5500** Seiko Instruments USA, Inc., 1130 Ringwood Ct., San Jose, CA 95131; 408/922-5800, 800/873-4561.

**816 QMS ColorScript 100 Model 10** QMS, Inc., 1 Magnum Pass, Mobile, AL 36618; 205/633-4300, 800/631-2692.

**817 QuickKeys** CE Software, Inc., P.O. Box 65580, West Des Moines, IA 50265; 515/224-1995, 800/523-7638.



**818 RagTime 3** Migrant Software, 313 Iona Ave., Narberth, PA 19072; 215/667-9781.

**819 Redux** Microseeds Publishing, Inc., 7030-B W. Hillsborough Ave., Tampa, FL 33634; 813/882-8635.

**820 Retrospect** Dantz Development Corp., 1510 Walnut St., Berkeley, CA 94709; 415/849-0293.



**822 Screen Gems** Microseeds Publishing, Inc., 7030-B W. Hillsborough Ave., Tampa, FL 33634; 813/882-8635.

**823 Shadow** Natural Intelligence, Inc., 86 Richdale Ave., Cambridge, MA 02140; 617/266-7858, 800/999-4649.

**824 Shanghai** Activision, 3885 Bohannon Dr., Menlo Park, CA 94025; 415/329-0800.

**825 Shortcut** Aladdin Systems, Inc., Deer Park Center, #23A, Aptos, CA 95003.

**826 Si3033, Si3050** Siclone Sales & Engineering Corp., 1515 Centre Pointe Dr., Milpitas, CA 95035; 408/263-8207, 800/862-2636.

**SmartForm Assistant, SmartForm Designer** Claris Corp., 5201

Reader Service

Patrick Henry Dr., Santa Clara, CA 95052; 408/727-8227.

**828 SnapJot** Wildflower Software, 21W171 Coronte Rd., Lombard, IL 60148; 312/916-9360.

**829 Sonar, Sonar Professional** Virginia Systems, Inc., 5509 W. Bay Ct., Midlothian, VA 23112; 804/739-3200.

**831 Star Wars** Brøderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/492-3200, 800/521-6263.

**832 Suitcase II** Fifth Generation Systems, Inc., 10049 N. Reiger Rd., Baton Rouge, LA 70809; 504/291-7221, 800/225-2775.

**833 SUM II** Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600, 800/441-7234.

**834 SuperGlue II** Solutions International, 30 Commerce St., Williston, VT 05495; 802/865-9220.

**835 SuperLaserSpool** SuperMac Software, 485 Potrero Ave., Sunnyvale, CA 94086; 408/245-2202.

**836 SV6510** Eastman Kodak Co., Electronic Photography Division, Rochester, NY 14650; 716/774-4000, 800/445-6325.

SYSTEM UPGRADES

**837 Apple Computer, Inc.**, 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

**838 Bay Tech**, 9001 Blind Pass Rd., Saint Petersburg, FL 33706; 813/360-8617.

**839 Computer Care, Inc.**, 420 N. Fifth St., #118, Minneapolis, MN 55401; 612/371-0061, 800/950-2273.

**840 Julian Systems, Inc.**, 220 Bates Ave., Ste. J, Concord, CA 94520; 415/686-4400.

**841 Kennect Technology**, 120-A Albright Way, Los Gatos, CA 95030; 408/370-2866, 800/552-1232.

**842 Mac Doctor Electronics, Inc.**, 1145 Terra Bella Ave., Mountain View, CA 94043; 800/822-5524.

Reader Service

**843 MacProducts USA**, 8303 MoPac Expwy., #218, Austin, TX 78759-8369; 512/343-9441, 800/622-3475.

**844 Mirror Technologies, Inc.**, 2644 Patton Rd., Roseville, MN 55113; 612/633-4450, 800/654-5294.

**845 Newbridge Microsystems**, 20 Edgewater St., Kanata, Ontario K2L 1V8; 613/836-1073, 800/267-7231.

**846 Peripheral Land, Inc.**, 47421 Bayside Pkwy., Fremont, CA 94538; 415/657-2211, 800/288-8754.

**847 Peripheral Outlet**, 314 S. Broadway, Ada, OK 74820; 405/332-6581, 800/332-6581.

**848 Tercom Corp.**, 6920 Roosevelt Way NE, #193, Seattle, WA 98115; 206/527-1257, 800/669-7555.

**849 Total Systems**, 99 W. Tenth Ave., Eugene, OR 97401; 503/345-7395, 800/874-2288.



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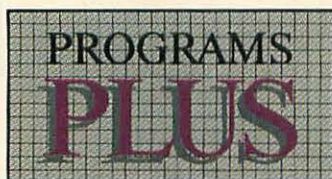
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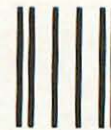
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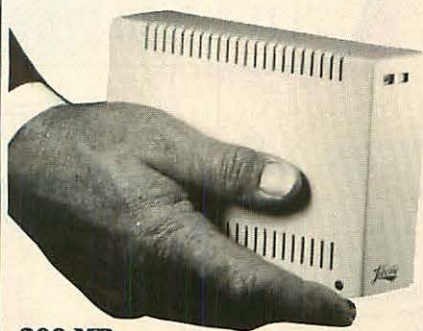
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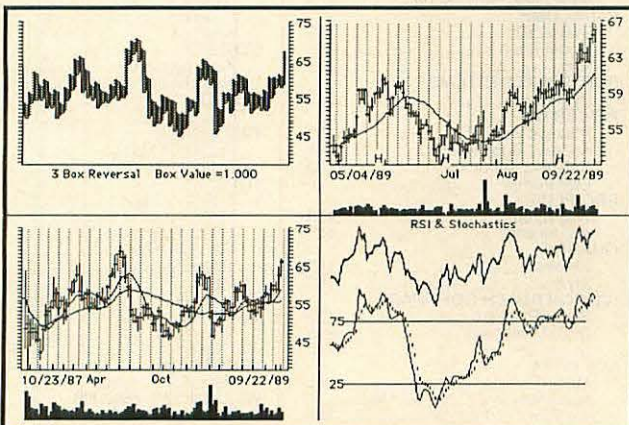
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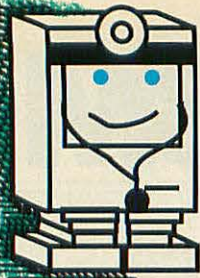
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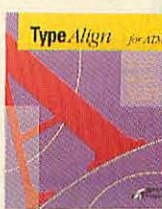
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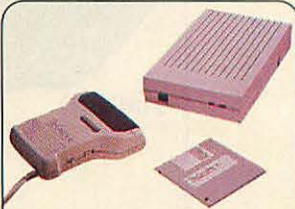
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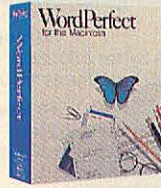
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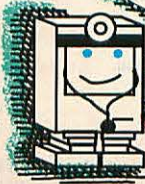
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Quantum 40 19ms (2 Year Warranty!)	\$899.	<b>\$479.</b>
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CMS Enhancements Pro 80 28ms	\$749.	<b>\$669.</b>
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Quantum 170 15ms (2 Year Warranty!)	\$2,899.	<b>\$1,149.</b>
Toshiba 105 25ms	\$1,499.	<b>\$699.</b>
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Imprimis - MacWren 300 16ms	\$4,395.	<b>\$1,999.</b>
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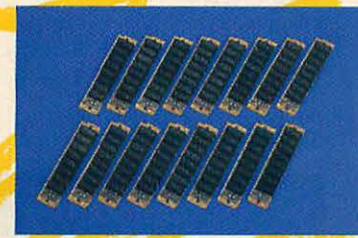


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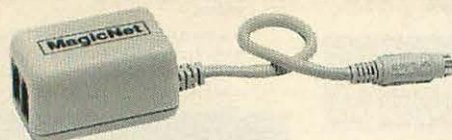
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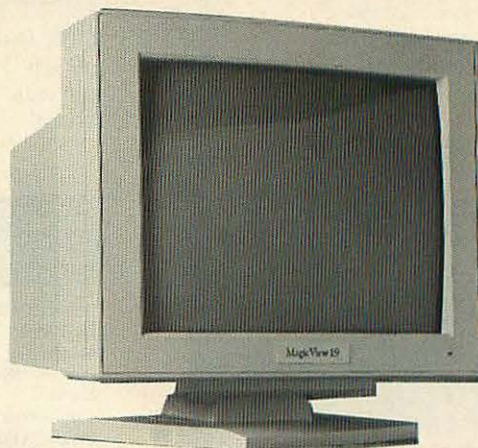
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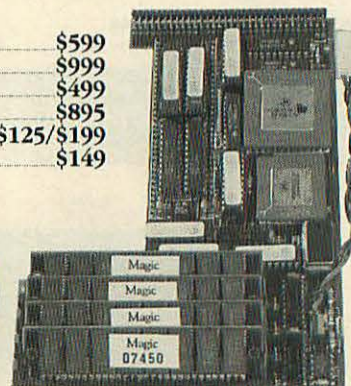
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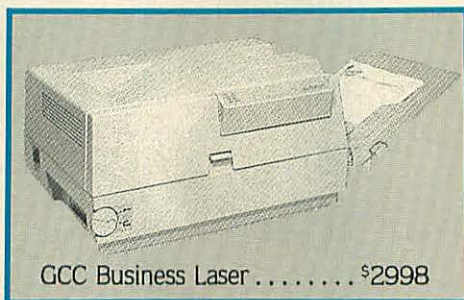
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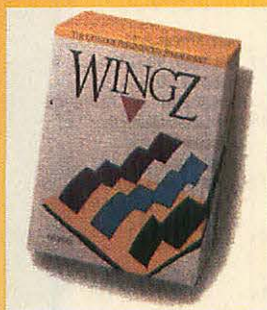
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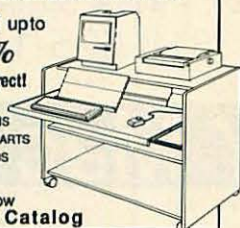
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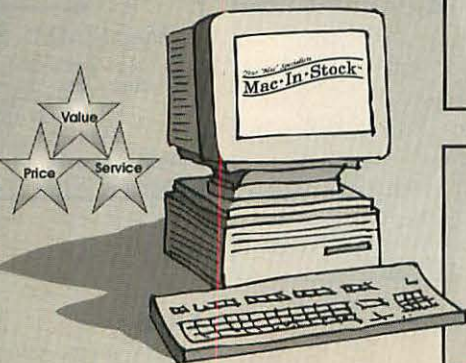
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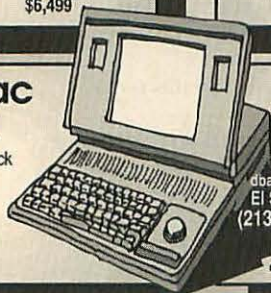
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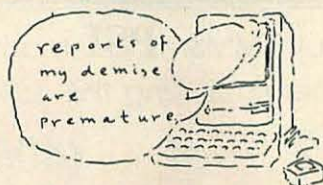
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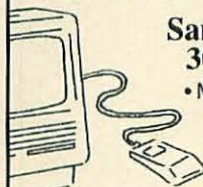
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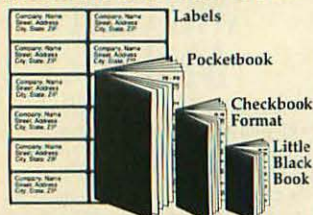


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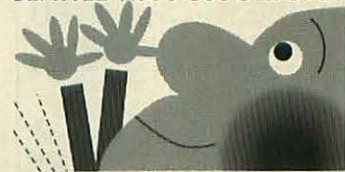
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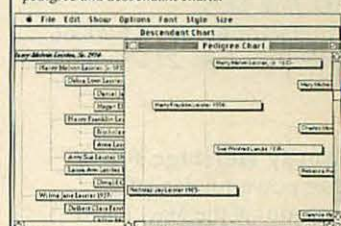


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Months on chart	Last month	This month	
▼	▼	▼	BUSINESS SOFTWARE
48	2	1	<b>Microsoft Excel</b> <i>Microsoft</i>
57	1	2	<b>Microsoft Word</b> <i>Microsoft</i>
36	3	3	<b>Microsoft Works</b> <i>Microsoft</i>
44	4	4	<b>Aldus PageMaker</b> <i>Aldus</i>
33	5	5	<b>MacWrite</b> <i>Claris</i>
17	7	6	<b>WordPerfect for the Macintosh</b> <i>WordPerfect</i>
12	10	7	<b>QuarkXPress</b> <i>Quark</i>
45	6	8	<b>MacDraw</b> <i>Claris</i>
13	—	9	<b>Adobe Illustrator 88</b> <i>Adobe</i>
3	9	10	<b>Wingz</b> <i>Informix</i>

▼	▼	▼	EDUCATION SOFTWARE
11	1	1	<b>Where in the World Is Carmen Sandiego?</b> <i>Broderbund</i>
40	2	2	<b>Math Blaster</b> <i>Davidson &amp; Associates</i>
24	3	3	<b>Reader Rabbit</b> <i>The Learning Company</i>
3	4	4	<b>Math Rabbit</b> <i>The Learning Company</i>
5	—	5	<b>Speed Reader</b> <i>Davidson &amp; Associates</i>

▼	▼	▼	ENTERTAINMENT SOFTWARE
38	—	1	<b>Flight Simulator</b> <i>Microsoft</i>
36	2	2	<b>Dark Castle</b> <i>Silicon Beach Software</i>
40	1	3	<b>MacGolf</b> <i>XOR/PCAI</i>
8	5	4	<b>Crystal Quest</b> <i>Casady &amp; Greene</i>
15	—	5	<b>Beyond Dark Castle</b> <i>Silicon Beach Software</i>

▼	▼	▼	NETWORK/DATA COMMUNICATIONS
36	1	1	<b>TOPS</b> <i>TOPS</i>
32	2	2	<b>AppleShare</b> <i>Apple Computer</i>
39	4	3	<b>LocalTalk</b> <i>Apple Computer</i>
24	—	4	<b>PhoneNet</b> <i>Farallon Computing</i>
6	3	5	<b>NetWare for the Macintosh</b> <i>Novell</i>

Months on chart	Last month	This month	
▼	▼	▼	HARD DISKS*
17	1	1	<b>MacStack SD20</b> <i>CMS Enhancements</i>
1	—	2	<b>MacStack SD40</b> <i>CMS Enhancements</i>
8	—	3	<b>DataFrame XP30</b> <i>SuperMac</i>
21	—	4	<b>Rodime 20 Plus External</b> <i>Rodime</i>
2	4	5	<b>Rodime 40 Plus External</b> <i>Rodime</i>

▼	▼	▼	ADD-IN BOARDS/MEMORY
22	4	1	<b>Apple 1MB Memory Expansion Kit</b> <i>Apple Computer</i>
26	1	2	<b>Radius Accelerator</b> <i>Radius</i>
14	2	3	<b>Radius Interface Display</b> <i>Radius</i>
26	3	4	<b>Apple 2MB Memory Expansion Kit</b> <i>Apple Computer</i>
16	5	5	<b>Macintosh II Video Card</b> <i>Apple Computer</i>

## PRODUCT WATCH

Recent or forthcoming products of particular interest.

**Enhance** *MicroFrontier* Gray-scale editor

**TypeAlign** *Emerald City Software* Special effects add-on to Adobe Type Manager

**UltraPaint** *Deneba Software* Color paint program

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during October 1989.

\*Does not include hard disks installed at the factory.



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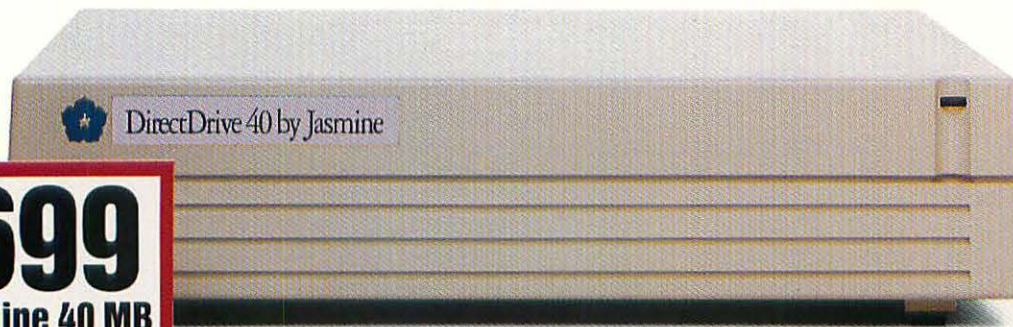
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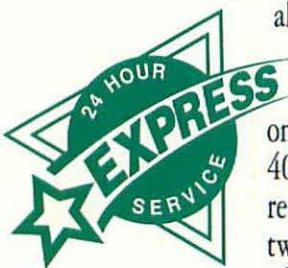
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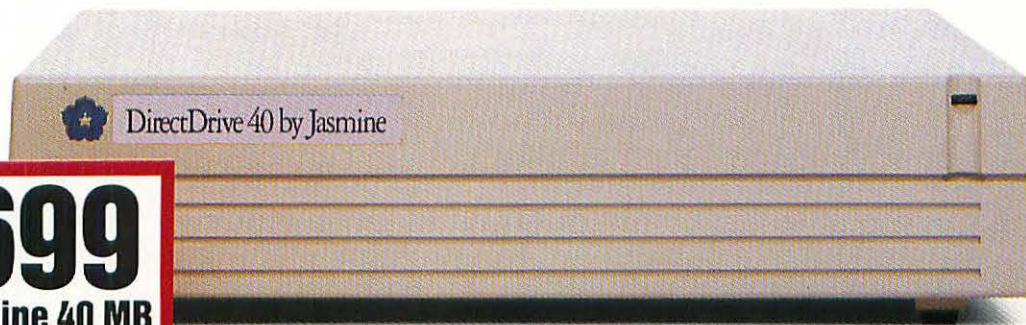
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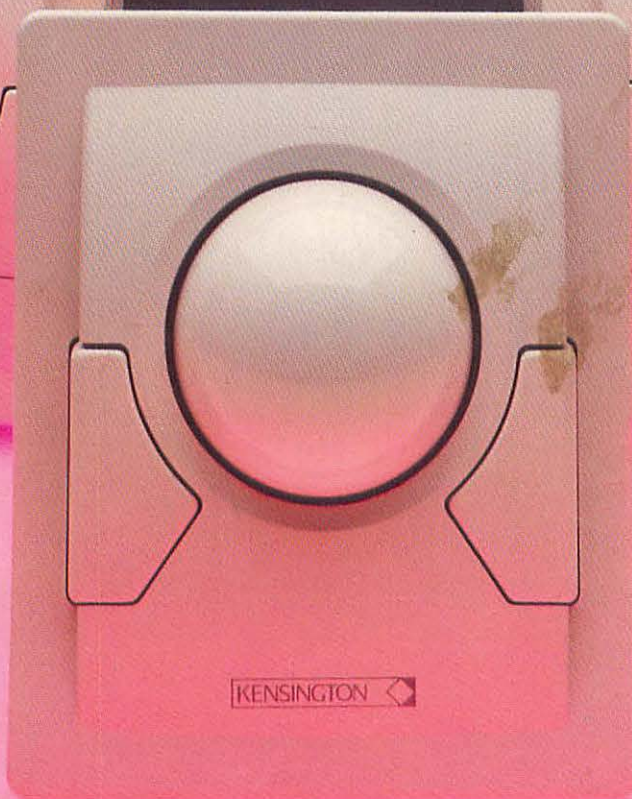




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